THE STONE ARITHMETIC

PRIMARY

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THE STONE ARITHMETIC

PRIMARY

BY

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PREFACE

THIS book covers the work of the third and the fourth grades of the modern curriculum. For the convenience of the teacher the work of each year is divided into semesters. While all facts and processes taught in the second year have been carefully reviewed, one year in "A Child's Book of Number" of this series of texts or its equivalent is presupposed.

The book meets the real aims of a course in number, which are to develop: (1) an automatic control of the primary facts and processes; (2) ability to use them in problems that arise in the common experiences of child life; and (3) the habit of using arithmetic to answer questions of quantitative relationships that arise in life situations.

To do this the facts and processes have been carefully presented, and well-graded drills are given at proper intervals throughout the book. The author recognizes that some primary number facts seem harder to learn than others mainly because they recur less frequently in the child's use of number in out-of-school activities. Hence it becomes necessary to use those facts of infrequent recurrence more often than the others in the drills of the text. To keep the child's interest in drill, time limits are put on most of the drill exercises. These limits have been made either from classroom experiments or from existing standards of skill. It is not expected that all pupils will reach the given standard

at the first trial, but that a desire to reach it will furnish a motive for trying the same exercises again and again until it is reached.

To develop ability to use the facts and processes, problems are taken from life situations of interest to children rather than from adult activities. This necessarily narrows the range of problem material, but it results in problems that are concrete and interesting to the child. Numbers representing dollars and cents are used throughout the text. Thus, in problems involving three-figured numbers, such numbers as $3.75 are used instead of $375. The first of these numbers is one that the child can image, and it is a number that he uses in real problems that he meets in actual life, while $375 is too large for him to image and a number that does not arise in his actual experiences. This use of such numbers not only keeps them within his comprehension and needs, but it paves the way for an early introduction to all but two of the problems with decimals — multiplying and dividing by a decimal.

The problems being about situations actually met by children and of interest to them not only makes them concrete, but such problems will lead to the habit of using arithmetic to answer questions that arise in daily life.

The book has been written *for* children and directly *to* children. There are no "explanations" written primarily for the teacher, as has been the common practice in the textbook making of the past, but simple directions of how to think out a new process are given so clearly that any normal child can follow them without the aid of the teacher.

JOHN C. STONE

JANUARY, 1925

SUGGESTIONS TO TEACHERS

To secure the best results in a minimum amount of time, the order, methods, and language of the text should be followed very closely. While order, method, and language differ greatly from those of the older type of texts, they are the results of over twenty-five years of careful study of the pedagogy of arithmetic worked out directly from classroom experiences.

The Purpose of Primary Arithmetic

Success in teaching any subject demands that the teacher have well-defined and proper aims. The aims of a course in primary arithmetic are: to develop the meaning of the primary facts and processes, and to secure an automatic control of them by the pupil; to develop the power to use these facts and processes in problems that are real and concrete to the child; and to develop the habit of using arithmetic to answer questions of quantitative relationships that arise in life's activities.

The Development of Facts and Processes

Every new fact and process should be introduced through some concrete life situation of interest to the child. This principle has been adhered to throughout the book. To memorize facts and processes without knowing what they mean or how to use them is useless.

Knowing what a fact means helps the child to remember it; enables him to find it for himself if he forgets it; and shows him how and when to use it in problems.

The Primary Addition Facts

The addition facts are found through counting to show the meaning of the facts, and are learned to save counting. While most textbooks and courses of study consider "forty-five primary facts in addition," there are one hundred forms that arise in the addition of two one-figured numbers including zero. These are given on page 22 and should be reviewed until all pupils can give them in 2 minutes or less without making a mistake.

The drills should be both *sight* and *oral*. That is, the child should give the results when seeing the figures in the book and from dictation by the teacher.

The Primary Subtraction Facts

Economy demands that subtraction be taught as the inverse of addition. To teach the tables as *new* facts is inadvisable because there are 100 of the facts including those with zero. When taught as the inverse of addition, they are only new forms of facts already known. That is, knowing that "5 and 3 are 8," the child can answer the question "5 and what are 8?"

Be sure that the child gets the three uses of subtraction as given on pages 7–9. The old method gives the impression that to subtract means to take away, but this is only one of the three uses of subtraction.

The Primary Facts of Multiplication

The tables of multiplication are developed by adding equal numbers to show the child the meaning and use of the facts and that he multiplies to save adding when the addends are all alike. See pages 44, 46, 52, and so on.

The child should see that $4 \times 3 = 3 \times 4$, and so on, and that he knows a part of each new table from those already learned. The most satisfactory results will be obtained by

following the order and method of this text rather than by developing the table of 3's, 4's, and so on, by counting by 3, 4, and so on, as was done in most of the older texts.

The Primary Facts of Division

The division facts are not new facts, but new forms of old facts. When a child knows that $2 \times 4 = 8$, he can give the "missing factor" of $? \times 4 = 8$ or $2 \times ? = 8$. And thus he has but a new *form*, 2)8 or 4)8, to learn and not a new *fact*. But to teach "8 divided by 2 equals 4" or "2 goes into 8 four times" without showing the relation of division to multiplication makes the facts new ones.

There are two meanings of division, depending upon which factor is unknown. Thus to $? \times 4 = 8$, the question is, "How many 4's in 8?"; and to $2 \times ? = 8$ the question is, "What is one of the two equal numbers that make 8?" or "What is one half of 8?" But to try to teach the child these two meanings and the two forms of expression is a waste of time. He should read 2)8 or 4)8 as "8 divided by 2" and "8 divided by 4."

The Written Processes

There should be no further attempt to show the child the "why" of the written processes than the reasons given in the text. The child should be able to read the simple directions of "what to think" for himself. But if he should need further help, the teacher should take other examples and follow the method of the text in telling him what to think.

The Drill Exercises

To secure speed and accuracy there must be much drill with attention. Each drill exercise should hold the complete attention of the child. He should use all the skill

at his command and observe his gradual improvement. To assist him in this, most of the drills and tests have a time limit. It is not expected that all will reach the given standard on the first trial, but that it will encourage a child to try the same or similar exercises until he does.

This book contains much more drill work than is usually given. By using the same exercises until the desired skill is obtained supplementary drills will not be needed. If, however, a teacher makes up drills, she should be careful to see that they contain the facts upon which the child needs drill rather than those that he does not need. Thus he may know perfectly 2×4 and hesitate at 9×7 and similar facts. Hence the drills need not contain 2×4, but should contain those that he needs.

Checking Computations

The child is shown how to check his computations and directed throughout the book to do so. He should not rely upon an "answer book," but should develop the habit of checking all work as in actual life. The teacher should not accept computation that is not 100% accurate.

The Problems

The problems are to develop power to interpret an arithmetical situation and to determine what to do; and to lead to the habit of using arithmetic whenever situations in life need it to answer a real question. Hence the problem material is kept within life situations familar to most children.

Prices of many commodities vary greatly in different sections of the country and with the season. To use current prices of your community will vary the problems, make them seem more real, and will more likely lead to the habit of using arithmetic in the everyday affairs of life.

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PRIMARY ARITHMETIC

THIRD GRADE: FIRST SEMESTER

1. Count the children at the picnic.

2. There are 2 sandwiches for each. As you point to each child, count 2, 4, 6, and so on, and find how many sandwiches there are.

3. It cost each child 10 cents to ride on a bus to the picnic. By pointing to each, count 10, 20, 30, and so on, and find how many cents it cost all. If you made no mistake, you found that it cost 100 cents for all.

100 cents make 1 dollar.
100¢ = $1.00.

4. By pointing to each, count 5, 10, 15, and so on, and find how much 5 cents from each would be.

ADDING 2

Frank had 6 little rabbits and bought 2 more. He then had how many?

> *If you should forget that 6 and 2 are 8, you would have to find how many by counting. To save counting, you must remember that 6 and 2 are 8.*

When you remember how many without counting, you are *adding*. The answer is the *sum*. Adding saves counting.

ADDITION TABLE FOR STUDY

Study each group carefully. Think, "7 and 2 are 9," as you look at the first group.

Study all in the same way as you look at each group.

7	4	8	9	3	5	1	6	2
2	2	2	2	2	2	2	2	2
9	6	10	11	5	7	3	8	4

Cover the sums with a sheet of paper and see if you can write them.

See if the sums that you wrote are like those in the table.

If any of the sums that you wrote are wrong, correct them. Then study those you had wrong until you can remember them.

Keep a little number book of all sums that you had wrong, or that you found hard to remember. Study them until you can give them accurately and quickly.

ADDING THREE NUMBERS

1. John and Frank have made a target game. Each boy throws three times and then adds his scores.

This is the way to add their scores:

2
4
1
7

Think, "2 and 4 are 6." Then think, "6 and 1 are 7."

But as you look at the figures say, "6, 7."

2. *Tell how they added these. Then cover the sums and see if you can add them:*

6	4	7	2	2	1	2	8	2
1	2	1	5	6	5	4	1	7
2	1	2	2	1	2	2	1	1
9	7	10	9	9	8	8	10	10

3. Add down, then add up. You should get the same sum each time.

2	1	2	1	2	1	1	2	1
6	6	5	4	2	7	6	7	6
2	1	1	2	1	1	2	1	2

ADDITION TABLE FOR STUDY

Look at each set of figures and think what it means. Cover the sums and see if you can write them.

If you have any that are wrong, write them in your number book and study them until you can remember them.

3	5	4	7	6	4	4	4	5
3	3	3	3	3	4	6	5	5
6	8	7	10	9	8	10	9	10

ADDING THREE NUMBERS

Add down, then up. Do not copy the figures. Lay a sheet of paper below and write the sums only.

1.	2.	3.	4.	5.	6.	7.	8.	9.
2	3	1	3	2	1	3	3	2
1	2	3	4	4	3	4	1	2
3	3	3	3	3	4	1	6	5

10.	11.	12.	13.	14.	15.	16.	17.	18.
3	2	3	4	1	3	4	3	2
2	7	5	2	5	6	2	5	6
5	1	2	3	4	1	4	1	2

MAKING PROBLEMS

1. Helen said, "I spent 5 cents for peanuts and 3 cents for candy. How much did I spend?"

2. Frank said, "I spent 4 cents for an apple and 4 cents for a banana. How much did I spend?"

3. Walter said, "I spent 2 cents for a cake, 3 cents for a pear, and 5 cents for an orange. How much did I spend?"

4. Mary said, "I bought an ice cream cone for 6 cents and some small cakes for 4 cents. How much did I spend?"

5. John said, "I bought an orange for 5 cents, a bar of candy for 2 cents, and a cake for 2 cents. How much did I spend?"

WRITTEN ADDITION WITHOUT CARRYING

1. John spent 12 cents for a top, 25 cents for a ball, and 21 cents for marbles. How much did he spend?

This is the way to find out:

Write the numbers in straight columns.

12
25
21
58

Begin with the right-hand column. Think, "7, 8." Write 8.

Then think, "3, 5." Write 5. So he spent 58 cents.

If you are not sure that you are right, add up. Think, "6, 8." Then think, "4, 5."

2. Walter earned 11 cents on Thursday, 15 cents on Friday, and 22 cents on Saturday. How much did he earn in the three days?

3. Nell got 12 pansies from one bed, 24 from another, and 13 from another. How many did she get from all three beds?

Add down, then add up. You should get the same sum both times.

Lay a sheet of paper below and write the sums only.

4.	5.	6.	7.	8.	9.	10.
21	32	34	42	14	31	41
43	14	21	13	23	16	24
14	21	12	24	42	42	32

11.	12.	13.	14.	15.	16.	17.
36	45	34	41	53	61	72
41	21	21	37	12	25	14
22	31	43	21	34	13	13

EXERCISES IN WRITTEN ADDITION

Do not copy the figures. Lay a piece of paper below and write the sums. When the sums of the first row are written, fold the paper down and write the next row of sums.

1.	2.	3.	4.	5.	6.
11	32	24	42	14	32
32	16	31	12	23	26
24	21	22	24	52	31

7.	8.	9.	10.	11.	12.
33	27	44	31	13	36
41	31	13	16	25	42
15	41	22	21	41	11

13.	14.	15.	16.	17.	18.
53	24	35	31	22	12
15	14	21	46	43	41
21	41	23	12	14	34

LEARNING HOW TO SUBTRACT

1. John wants a top that costs 9 cents. He has 6 cents. How much more does he need?

9¢
6¢
3¢

Write the 9¢ that he needs. Write the 6¢ below it.

Look at 9¢ and at 6¢, and think, "6¢ and 3¢ are 9¢." Write 3¢. He needs 3¢ more.

2. Mary wants a paper doll that costs 8 cents. She has 6 cents. How much more does she need?

8¢
6¢
2¢

Write 8¢ over 6¢. Look at 8¢ and at 6¢, and think, "6¢ and 2¢ are 8¢." Write 2¢. She needs 2¢ more.

3. Nell is going to make 9 paper dolls. She has made 5. How many has she to make?

4. What number added to the lower number will make the number above it?

4	8	3	8	6	4	9	8	8
2	4	1	2	4	1	2	5	1
7	5	9	7	9	6	5	9	7
4	1	8	2	6	5	2	4	1
6	8	7	9	9	6	8	7	9
3	7	3	1	7	2	6	5	3

5. Copy exercise 4 and write the answers. This is the way to write the first row:

4	8	3	8	6	4	9	8	8
2	4	1	2	4	1	2	5	1
2	4	2	6	2	3	7	3	7

See if the answer added to the number above it makes the top number.

When you find what to add to a given number to make a larger number, you are *subtracting*.

FINDING WHAT IS LEFT BY SUBTRACTION

1. Frank has 9 cents. If he spends 5 cents for marbles, how much will he have left?

9¢ 5¢ 4¢	*Think, "5¢ and 4¢ make 9¢; so he will have 4¢ left."*

2. Helen gathered 8 roses. If she takes 5 of them to her friend, how many will she have left?

$$\begin{array}{r} 8 \\ -\,5 \\ \hline 3 \end{array}$$

Think, "5 and 3 are 8; so she will have 3 left."

3. Walter has 7 plums. If he eats 4 of them, how many will he have left?

4. John has 8 marbles. If he gives his brother 2 of them, how many will he have left?

5. Mary has 8 paper dolls. If she gives Nell 3 of them, how many will she have left?

6. Frank has 9 cents. If he spends 6 cents, how much will he have left?

FINDING A DIFFERENCE BY SUBTRACTION

1. Mary is 8 years old and her little sister is 6 years old. How much older is Mary than her sister?

Think, "6 and 2 are 8; so Mary is 2 years older."

2. Frank has 6 little rabbits and Ralph has 9. How many more has Ralph?

Think, "6 and 3 are 9; so he has 3 more."

3. John walks 8 blocks to school and Frank walks 5 blocks. How many blocks more does John have to walk?

To tell the difference between two numbers, think what added to the smaller number will make the larger number.

Give the differences:

2	6	7	3	8	4	9	5	8
1	2	2	1	3	1	2	3	5
3	9	4	8	5	4	7	6	9
2	3	2	4	2	3	3	3	6

4. Ruth has 8 paper dolls and Dorothy has 5. How many more has Ruth?

SUBTRACTION TABLE FOR STUDY

These are the only subtraction facts with one-figured numbers. Cover the bottom figures and see if you can write them.

2	4	4	3	4	5	8	5	9
1	3	2	1	1	3	7	2	8
1	1	2	2	3	2	1	3	1
5	6	6	8	6	5	7	3	7
4	3	1	4	4	1	6	2	3
1	3	5	4	2	4	1	1	4
8	6	7	7	9	6	8	9	9
6	5	5	1	6	2	1	5	1
2	1	2	6	3	4	7	4	8
7	8	8	9	7	9	9	8	9
2	5	2	3	4	2	4	3	7
5	3	6	6	3	7	5	5	2

WRITTEN SUBTRACTION WITHOUT CARRYING

1. John wants to buy a knife that costs 85 cents. He has 51 cents. How much more does he need?

Write the larger number first. Write the smaller number below it.

85
51
34

Think, "1 and 4 are 5." Write 4.
Then think, "5 and 3 are 8." Write 3.
He will need 34 cents more.
If you are not sure that the answer is right, add up, thinking, "4 and 1 are 5; 3 and 5 are 8."

2. Mary is going to invite 36 little girls to her birthday party. She has written 21 invitations. How many more should she write?

Write the larger number first. Write the smaller number below it.

36
21
15

Think, "1 and 5 are 6." Write 5.
Then think, "2 and 1 are 3." Write 1.
She has to write 15 more invitations, for 15 and 21 are 36.

In subtraction the larger number is always written above the other. Then we find what must be added to the lower number to make the number above it.

3. Frank wants to buy a kite that costs 95 cents. He has 63 cents. How much more does he need?

4. Mary and Tom are going with their parents to visit grandma. It is 84 miles to grandma's home. On the trip, their father said, "We have driven 41 miles." How much farther is it to grandma's?

5. When coming home, they took a longer road. Their father said, "It will be 96 miles home by this road." On the way home he said, "We have driven 54 miles." How many more miles will they have to drive?

Subtract:

6.	7.	8.	9.	10.	11.	12.
94	68	79	84	69	98	87
21	35	37	42	43	76	25

FINDING BY SUBTRACTION HOW MANY ARE LEFT

1. Mary had 86 cents and spent 25 cents for some ribbon. How much had she left?

First write what she had. Then write below it what she spent.

86
25
61

Think, "5 and 1 are 6." Write 1.

Think, "2 and 6 are 8." Write 6.

She had 61 cents left, for 61 cents and 25 cents make 86 cents

2. Helen had 78 cents and spent 34 cents of it for paper dolls. How much had she left?

3. Walter found 38 eggs and sold 24 of them to a neighbor. How many were left?

4. Helen has 68 cents in her bank. If she takes out 25 cents to buy candy, how much will she have left?

5. Frank and his brother sell papers. Frank got a bundle of 75 papers and gave his brother 34 of them to sell. How many did Frank have left?

Subtract:

6.	7.	8.	9.	10.	11.	12.
48	56	73	86	46	87	96
13	31	41	34	24	52	45

FINDING THE DIFFERENCE BY SUBTRACTION

1. John priced two knives. One cost 78 cents and the other 55 cents. What was the difference in price?

78
55
23

Write the larger number first. Then write the other number below it.

Think, "5 and 3 are 8." Write 3.

Think, "5 and 2 are 7." Write 2.

The difference in price is 23 cents, for 23 added to 55 will make 78.

2. Nell priced two dolls. One cost 95 cents and the other 81 cents. How much more did one cost than the other?

3. John weighs 87 pounds and Frank weighs 75 pounds. How much more does John weigh?

4. Walter has 48 marbles and Ralph has 36. How many more has Walter?

5. Fred sold 68 papers one week and Ned sold 53. How many more did Fred sell?

6. Helen paid 98 cents for a present for her mother and 65 cents for one for her aunt. How much more did her mother's present cost?

7. Ralph is 52 inches tall and his older brother is 63 inches tall. How much taller is the brother?

Find the differences:

8.	9.	10.	11.	12.	13.	14.
78	96	84	69	85	76	64
35	21	43	26	21	53	31

15. Fred has 48 marbles and Dick has 35. How many more marbles has Fred than Dick?

16. Helen wrote 73 words while Nell wrote 96. How many more did Nell write?

17. Ruth paid 98 cents for some ribbon and 52 cents for some lace. How much more did the ribbon cost?

18. Mary's grandmother is 64 years old. Her mother is 41 years old. How much older is grandmother?

19. Mary has 46 cents and Lucy has 78 cents. How much more has Lucy?

20. In a small school there were 72 boys and 85 girls. How many more girls than boys in the school?

EXERCISES IN SUBTRACTION

Do not copy the figures. Lay a piece of paper below and write the answers. To be sure that you made no mistake, see if the answer added to the lower number makes the number above it.

1.	2.	3.	4.	5.	6.	7.
48	96	72	86	95	84	67
21	34	51	35	21	63	42

8.	9.	10.	11.	12.	13.	14.
96	93	86	75	95	89	76
73	32	45	24	71	27	13

15.	16.	17.	18.	19.	20.	21.
94	88	69	48	57	69	48
42	35	17	26	15	37	25

22.	23.	24.	25.	26.	27.	28.
76	69	78	65	82	93	79
34	48	51	44	21	12	33

29. Frank wants a knife costing 68 cents. He has 55 cents. How much more does he need?

30. Mary has 76 cents in her bank. If she spends 25 cents of it, how much will she have left?

31. Helen weighs 72 pounds and her brother weighs 97 pounds. How much more does her brother weigh?

ADDITION TABLE FOR STUDY

Study these numbers and think what they mean. Then cover the sums and see if you can say them.

It will help you to remember them if you see that the number of "teen" is one less than the number added to 9.

9	9	9	9	9	9	9	9
2	5	7	3	4	6	9	8
11	14	16	12	13	15	18	17

ADDING THREE OR FOUR NUMBERS

Add down:

1.	2.	3.	4.	5.	6.	7.	8.	9.
3	8	7	5	1	4	6	7	5
6	1	2	4	8	5	3	2	4
4	6	8	7	9	3	5	2	8

10.	11.	12.	13.	14.	15.	16.	17.	18.
2	3	5	6	1	4	1	3	1
1	2	1	1	7	2	3	4	7
6	4	3	2	1	3	5	2	1
4	6	7	5	8	6	9	5	4

19.	20.	21.	22.	23.	24.	25.	26.	27.
5	6	3	2	1	4	3	2	2
2	1	3	3	6	2	2	4	4
2	2	3	4	2	3	2	2	3
7	5	8	6	8	9	9	9	2

ADDITION TABLES FOR STUDY

Cover the sums and see if you can say them.

8	8	8	8	8	8	8
6	7	5	8	4	3	9
14	15	13	16	12	11	17

10	10	10	10	10	10	10	10	10
3	5	9	6	4	7	8	2	1
13	15	19	16	14	17	18	12	11

Notice that 4 and 10 are 4-"teen"; 7 and 10 are 7-"teen."

"Teen" means "and ten."

REVIEW EXERCISES

Write the sums:

7	6	8	5	3	4	8	8
8	8	8	8	8	8	7	6

7	6	8	5	3	4	2	9
9	9	9	9	9	9	9	9

Add down:

4	3	6	5	1	6	5	1	4
4	5	2	3	7	2	3	7	4
6	7	8	4	5	3	6	7	4

5	2	6	4	7	1	6	7	5
4	7	3	5	2	8	3	2	4
6	7	8	4	5	3	6	7	8

PROBLEMS

1. John wants to buy a 15-cent ball. He has 9 cents. How much more does he need?

2. Mary wants to buy a 12-cent paper doll. She has 9 cents. How much more does she need?

3. Nell wants 16 favors for her party. She has made 9. How many more does she need?

4. Frank is reading a story. There were 14 pages to read. He has read 8 pages. How many more are there to read?

5. Helen needs 12 place cards for a birthday dinner. She has made 8. How many more has she to make?

6. Walter earned 9 cents one day and 7 cents the next. How many cents did he earn in both days?

7. Frank sold 8 papers one day and 6 papers the next day. How many did he sell in both days?

8. John wants to earn 12 dollars before Christmas. He has earned 8 dollars. How much more has he to earn?

9. Nell gets 7 cents for dusting the room and 8 cents for drying the dishes. How much does she get for both?

10. Mary invited 15 little girls to her party. Nine have already come. How many more are to come?

11. Helen made 16 paper dolls and gave 9 of them away. How many had she left?

12. Ralph spent 35 cents for a ball and 22 cents for marbles. How much did he spend for all?

ADDITION TABLE FOR STUDY

Look at these numbers and think what they mean. Cover the sums and see if you can write them. Correct and study any you have wrong.

6	6	6	7	7	7
6	5	7	7	5	4
12	11	13	14	12	11

1. Close your eyes and say, "6 and 6 are 12," and so on, until you say all of them.

"6 and 6 are 12" is also written "6 + 6 = 12."
+ means "and."
= means "are" or "make."

2. Write the six sums in this new way.

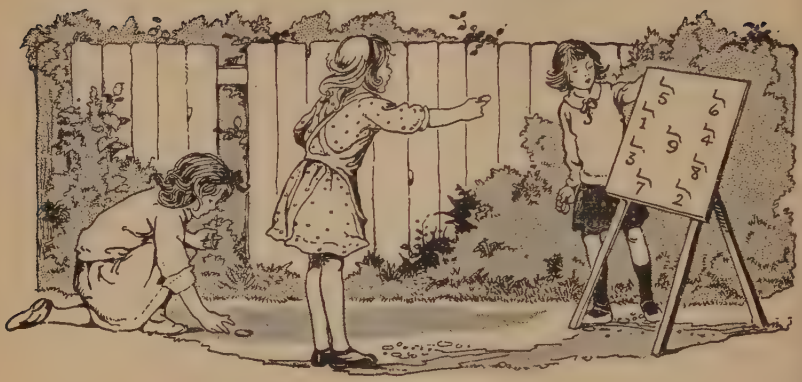
ADDING THREE OR FOUR NUMBERS

Add down:

4	5	3	4	2	6	5	3	4
2	1	3	3	5	1	2	2	3
6	5	7	7	5	4	4	6	6
4	5	4	6	2	6	4	2	3
4	2	2	2	5	3	3	2	5
6	8	4	6	6	3	8	7	3
3	4	3	2	3	2	5	3	4
1	1	1	4	2	4	1	2	2
2	2	3	1	2	1	2	2	1
6	7	5	4	5	6	3	6	7

ADDING ZEROS

0 is called *zero* and means "not any."



These girls are playing a ring-toss game. They each toss three times. These are their scores. The 0 means that they got nothing that toss.

1.	2.	3.	
3	0	6	*In* **1**, *look at 3 and 4 and think 7.*
0	2	3	*In* **2**, *look at 2 and 7 and think 9.*
4	7	0	*In* **3**, *look at 6 and 3 and think 9.*
7	9	9	

4. In three tosses Alice got 9, 0, and 8. What was her score?

5. Ruth got 0, 8, and 5. What was her score?

6. Jane got 0, 0, and 9. What was her score?

Add:

7.	8.	9.	10.	11.	12.	13.	14.	15.
1	2	0	5	6	4	5	9	7
3	0	1	3	1	0	1	1	0
0	3	3	0	3	3	0	3	2
4	4	2	2	0	2	4	0	3

Lay a sheet of paper below the numbers and write the sums:

16.	17.	18.	19.	20.	21.	22.
32	30	27	40	36	42	34
40	26	42	24	41	30	20
16	31	20	31	20	25	13

23. Frank sold 30 papers on Thursday, 28 on Friday, and 40 on Saturday. How many did he sell in three days?

24. Helen spent 45 cents for paper, 20 cents for envelopes, and 12 cents for stamps. How much did she spend for all?

25. There are 40 children in the second grade and 38 in the third grade. How many in both grades?

26. Mary went shopping for her mother. She spent 40 cents for butter, 35 cents for coffee, and 12 cents for a box of crackers. How much did she spend?

27. Walter wants to buy a 40-cent ball, a 20-cent kite, and 15 cents worth of marbles. How much will all cost?

28. There are 30 days in April, 31 days in May, and 30 days in June. How many days in the three months?

REVIEW OF ADDITION FACTS

6	9	7	7	6	9	5	8	9	5
7	7	5	8	8	6	6	5	8	9
5	6	8	9	5	7	8	7	6	9
7	5	6	5	8	6	7	9	9	2
8	4	6	4	4	8	7	9	4	3
9	7	6	6	8	3	7	4	5	9
6	2	8	3	4	9	7	8	5	9
4	9	4	8	9	3	4	8	4	9
3	2	3	6	5	2	2	7	5	3
7	8	6	2	3	7	4	3	2	2
4	7	6	2	8	2	4	3	3	2
3	2	3	5	2	6	2	5	4	3
9	5	5	3	4	8	1	3	2	1
1	1	5	1	4	1	4	3	1	7
1	1	2	1	6	7	1	1	1	1
6	9	2	3	1	1	5	1	2	8
4	0	0	0	0	8	0	2	5	9
1	7	2	9	6	0	4	0	0	0
3	0	7	0	0	1	6	4	0	0
0	5	0	1	8	0	0	0	3	0

PLAYING "BLIND MAN"

These children are playing a game after school. They call it "Blind Man." Each child has a large number on a card. Holes are cut in two corners of the card. A string is tied through the holes in the card, and it is hung over the head so that all can see the number. A ring is formed and all players must keep within the ring.

One child is blind man. The blind man is blindfolded and catches some one. The one caught adds his number to the number of the blind man and gives the sum. The blind man then subtracts his number from the sum given, to get the number of the one caught. If he is correct in "guessing" the number of the one caught, he opens his eyes and the one caught is blind man. Would you like to play this game?

In the picture, 3 has caught 5. What must 5 say? What must 3 then "guess"?

DRILL IN WRITTEN ADDITION

Lay a strip of paper below the exercises and write the sums only.

Add down. After you have added the first set, add each up from the bottom. You should get the same sum each time. If you do not, you made a mistake either the first or second time you added. If you made a mistake, correct it.

You should add any seven of these in 3 minutes.

1.	2.	3.	4.	5.	6.	7.
31	30	24	23	31	14	42
24	34	40	30	24	32	34
12	21	22	24	13	22	21

8.	9.	10.	11.	12.	13.	14.
36	25	16	32	38	22	41
21	32	32	17	40	31	16
40	21	40	30	21	43	32

15.	16.	17.	18.	19.	20.	21.
53	27	31	26	32	43	26
13	12	46	31	14	14	32
21	50	12	42	21	30	21

22.	23.	24.	25.	26.	27.	28.
32	41	31	42	27	16	15
31	17	25	16	21	13	31
44	30	43	30	40	70	52

PROBLEMS TO SOLVE

1. Helen had 25¢. Her mother gave her 20¢ and her father gave her 30¢. How much money did she then have?

2. Mary wants some crepe paper and some paper dolls. They will all cost 48¢. She has only 25¢. How much more does she need?

3. Frank has 78¢. If he spends 32¢ for marbles, how much will he have left?

4. Fred's catcher's glove cost 96¢ and his bat cost 75¢. How much more did the glove cost?

5. Nell went to the store for her mother. She spent 30¢ for sugar, 28¢ for tea, and 40¢ for butter. How much did all cost?

6. There were 38 children in a third grade. If 21 of them were girls, how many boys were there?

7. Ralph had 68 marbles and lost all but 45 of them. How many did he lose?

8. Ralph and Donald sell papers. Ralph sold 50 one day and Donald sold 48. How many did both sell?

9. Mary picked 28 roses. If she takes 12 to her aunt, how many will that leave for her mother?

10. By walking to school instead of riding Frank saved 21¢ one week and 28¢ the next. How much did he save in two weeks?

11. Ruth saved 21¢ one week, 35¢ the next, and 30¢ the next. How much did she save in three weeks?

CENTS, DIMES, NICKELS, AND QUARTERS

1. A dime is how many cents?

2. A nickel is how many cents?

3. If you buy a bag of candy costing 9¢, and give the clerk a dime, how much change should he give you?

4. If you buy a box of candy costing 12 cents, how much more than a dime should you give the clerk?

5. Tell how much more than a dime:
   14 cents; 16 cents; 18 cents; 15 cents.

6. A quarter is how many cents?

7. Two dimes are worth how many cents?

8. A quarter is worth how much more than 2 dimes?

By looking at a two-figured number that means cents, you can tell how many dimes and cents it is worth. The left-hand figure shows the number of dimes. The right-hand figure shows the number of cents.

Thus: 25 cents equal 2 dimes and 5 cents.
35 cents equal 3 dimes and 5 cents.
20 cents equal 2 dimes and no more.

9. Give as dimes and cents: 24 cents; 38 cents; 17 cents; 32 cents; 45 cents.

10. Give as cents: 2 dimes and 1 cent; 3 dimes and 7 cents; 4 dimes and 2 cents; 3 dimes and 8 cents.

11. Nell has 3 dimes and 5 cents. How much money has she?

12. Fred has 5 dimes and 8 cents. How much money has he?

WRITING DOLLARS AND CENTS

3 dollars is written $3.
3 dollars 25 cents is written $3.25.
2 dollars 8 cents is written $2.08.

1. *Write:*

5 dollars	2 dollars 15 cents
8 dollars	10 dollars 10 cents
10 dollars	6 dollars 5 cents

2. *Read:*

$7	$1.35	$2.39	$3.10
$12	$4.16	$7.98	$4.07

75 cents is written 75¢ or $0.75.
8 cents is written 8¢ or $0.08.

3. *Write in both ways:*

16 cents	30 cents	3 cents
24 cents	20 cents	2 cents

4. *Read:*

$0.24	$0.60	$0.05	$0.40
$0.36	$0.80	$0.10	$0.04

165 cents is written $1.65.

5. *Write:*

118 cents	208 cents	201 cents
320 cents	150 cents	670 cents

Read these:

6. I can buy a coaster for $4.75.

7. Mary paid $1.25 for a book.

8. Frank paid $0.85 for a baseball.

WRITTEN ADDITION WITH CARRYING

1. James spent 38¢ for a knife and 15¢ for a top. How much did both cost?

> *Think, "8¢ and 5¢ are 13¢." Then think, "13¢ makes 1 dime and 3¢." Write 3¢ under cents, and add the 1 dime to 3 dimes and 1 dime. Think, "1 and 3 and 1 make 5." Write 5.*
>
> 38¢
> 15¢
> 53¢

2. Walter spent 18¢ for candy and 25¢ for oranges. How much did he spend for both?

3. Charles paid 45¢ for a book and 18¢ for pencils. How much did he pay for all?

4. Frank earned 15¢ on Thursday, 25¢ on Friday, and 32¢ on Saturday. How much did he earn in three days?

5. Fred earned 25¢ one day and 15¢ the next. How much did he earn in both days?

> *Think, "5¢ and 5¢ are 10¢ or 1 dime and no cents." Write 0 under cents and carry the 1 dime to dimes' column. Think, "1, 2, and 1 are 4." Write 4.*
>
> 25¢
> 15¢
> 40¢

6. Nell bought a book costing 45¢ and some paper costing 25¢. How much did both cost?

7. Ann spent 38¢ for some ribbon and 42¢ for some lace. How much did she spend for both?

8. Harold earned \$3.25 one week, \$2.35 the next, and \$3.45 the next. How much did he earn in three weeks?

\$3.25 2.35 3.45 \$9.05	*Adding down, think, "5, 10, 15." Write 5, carry 1.* *Carrying 1, think "1, 3, 6, 10." Write 0, carry 1.* *Carrying 1, think, "1, 4, 6, 9." Write 9.*

Do not forget to write \$ and to separate dollars and cents with a period.

9. Helen bought a desk costing \$3.85 and a blackboard costing \$2.98. How much did both cost?

10. For a Hallowe'en party the decorations cost \$1.95, the apples \$1.75, and the other expenses were \$2.10. Find the cost of all.

11. Mary's dress cost \$6.98 and her hat cost \$3.75. Find the cost of both.

12. Ralph bought a suit for \$12.75 and a pair of shoes for \$4.85. How much did both cost?

13. Dick spent \$3.45 for a coaster and \$1.98 for a pair of roller skates. How much did both cost?

14. Mrs. Brown bought John a coaster costing \$3.45, Mary a little table costing \$3.40, and baby a kiddie car costing \$1.98. Find the cost of all.

DRILL IN WRITTEN ADDITION

You should add any seven of these in 4 minutes.

1.	2.	3.	4.	5.	6.	7.
38	27	54	63	35	42	34
40	46	20	29	26	27	26
24	30	39	54	80	30	21
17	28	45	20	49	18	87

8.	9.	10.	11.	12.	13.	14.
28	56	45	53	61	18	27
34	36	26	32	38	46	37
16	20	31	30	40	20	20
40	19	28	27	17	35	49

15.	16.	17.	18.	19.	20.	21.
40	51	48	37	35	38	74
38	16	21	25	26	26	17
16	30	30	40	19	19	10
29	29	28	18	30	40	45

22.	23.	24.	25.	26.	27.	28.
52	63	47	52	64	73	58
17	19	26	16	20	46	16
30	30	50	40	39	20	35
28	54	32	59	38	45	10

You should practice adding this page until you can add all twenty-eight exercises in 15 minutes.

Keep a record of how long it takes each time you try it.

ADDING BY ENDINGS

Study these sums. Notice that the sum of 13 and 4 ends in 7, the same as the sum of 3 and 4; that the sum of 12 and 6 ends in 8, just as the sum of 2 and 6; and so on.

Cover the sums and see if you can write them.

3	13	2	12	3	13	4	14
4	4	6	6	6	6	4	4
7	17	8	18	9	19	8	18

Add:

1.	2.
5	3
8	9
4	6
17	18

In 1, *look at 5 and 8 and think 13. Then look at 4 and think 17. Write 17.*

In 2, *what do you first think and say? Then what do you see and think? What do you write?*

As in 1 *and* 2, *tell how you add these:*

3.	4.	5.	6.	7.	8.	9.	10.	11.
6	9	3	5	7	4	6	8	4
8	4	9	7	7	8	7	5	9
4	4	4	6	4	6	6	4	6

12.	13.	14.	15.	16.	17.	18.	19.	20.
7	8	9	6	3	5	6	7	3
7	6	4	7	9	9	9	8	9
2	5	7	8	7	8	4	3	6

PRACTICE IN ADDING BY ENDINGS

Study these. Cover the sums and see if you can write them. If you miss any, study those you miss.

5	15	6	16	4	14	7	17	5	15
3	3	3	3	2	2	2	2	4	4
8	18	9	19	6	16	9	19	9	19

Add down:

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
6	8	9	5	9	7	8	6	6	6
9	7	7	9	8	8	8	8	8	9
3	3	3	2	2	4	3	2	4	4

ADDING BY ENDINGS: SUMS LESS THAN 20

Study the table. Cover the sums and see if you can write them. Correct and study any you had wrong.

11	11	11	11	11	11	11	11
1	3	6	2	4	7	5	8
12	14	17	13	15	18	16	19
12	12	12	13	14	12	14	15
2	5	3	3	5	6	3	3
14	17	15	16	19	18	17	18

Add down:

1.	2.	3.	4.	5.	6.	7.	8.	9.
3	6	5	6	8	9	8	6	9
8	6	9	7	4	6	5	7	7
4	3	5	6	7	3	4	3	3

10.	11.	12.	13.	14.	15.	16.	17.	18.
7	6	3	9	8	6	8	6	7
8	5	8	4	5	6	3	8	7
3	7	6	3	2	7	5	3	8

19. *Give the sums:*

13	16	14	12	15	18	17	12	13
1	1	1	1	1	1	1	2	2
15	17	14	16	12	14	16	13	15
2	2	2	2	3	3	3	3	3
12	15	13	14	12	14	13	12	12
4	4	4	4	5	5	5	6	7

Add down and then up:

20.	21.	22.	23.	24.	25.	26.	27.	28.
3	5	4	6	5	4	6	5	7
9	8	7	8	7	9	8	9	8
6	4	8	3	6	3	4	2	3

29.	30.	31.	32.	33.	34.	35.	36.	37.
4	3	4	5	4	6	2	5	8
8	9	8	9	8	5	9	7	8
5	4	7	4	7	8	7	7	3

38. Nell spent 5¢ for an ice cream cone, 9¢ for candy, and 4¢ for a banana. How much did all cost?

39. Frank earned $6 one week, $8 the next week, and $5 the next. How much did he earn in three weeks?

A RACE IN WRITTEN ADDITION

See who can finish any seven first without making a mistake.

Lay a sheet of paper below and write the answers.

1.	2.	3.	4.	5.	6.	7.
34	65	28	74	96	32	32
73	48	42	63	25	46	54
21	22	34	26	43	54	67
32	41	62	83	42	71	24

8.	9.	10.	11.	12.	13.	14.
26	42	81	39	47	46	28
38	29	27	61	43	34	35
45	36	25	16	34	45	42
36	42	57	62	55	28	56

15.	16.	17.	18.	19.	20.	21.
37	56	54	65	40	35	56
26	74	32	41	37	46	28
51	32	76	43	64	27	32
74	85	73	87	51	62	84

See how long it will take you to add the twenty-one exercises. Try the same exercise each week for five weeks and see how rapidly you improve.

Write in columns and add:

22. $38 + 26 + 30 + 12$.
23. $42 + 38 + 21 + 16$.
24. $56 + 42 + 17 + 20$.
25. $23 + 36 + 42 + 60$.
26. $16 + 36 + 28 + 50$.
27. $70 + 28 + 34 + 17$.

MISSING-NUMBER DRILLS

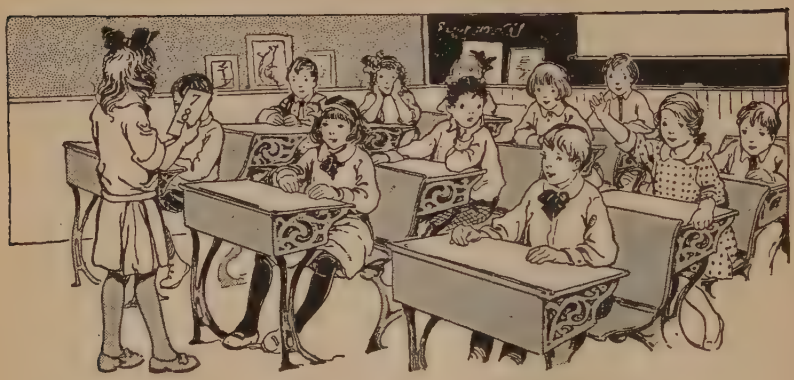
Tell the missing number:

1.	2	2	?	3	4	?	?	6	5
	?	?	8	?	?	7	1	?	?
	8	9	9	9	9	9	9	9	9
2.	9	3	?	?	5	?	2	?	1
	?	?	8	4	?	6	?	7	?
	10	10	10	10	10	10	10	10	10
3.	?	8	?	5	9	7	?	3	?
	2	?	4	?	?	?	6	?	9
	11	11	11	11	11	11	11	11	11
4.	?	8	7	?	4	3	9	5	7
	9	?	?	7	?	?	?	?	?
	12	12	12	12	12	12	13	13	13
5.	6	8	?	7	8	5	?	9	8
	?	?	4	?	?	?	6	?	?
	13	13	13	14	14	14	14	14	15
6.	?	7	6	8	?	7	?	9	9
	9	?	?	?	9	?	8	?	?
	15	15	15	16	16	16	17	17	18

7. Give the 4 pairs of numbers that make 9. That make 11. That make 12.

8. Tell the pairs that make 13. That make 14. That make 15. That make 16. That make 17.

A GUESSING GAME



These children call this a "Guessing Game." They have cards with two one-figured numbers on each. There are 45 cards. They are $\begin{matrix}1 & 1 & 1\\ 1 & 2 & 3\end{matrix}$ up to $\begin{matrix}9\\ 9\end{matrix}$. Your teacher will show you just what numbers to put on each card. The one standing looks at a card and says, "I am looking at two numbers that make ——. One number is ——. What is the other?"

If she looks at 7 and 8, she says, "I am looking at two numbers that make 15. One is 7; what is the other?" Or, she may say, "One is 8; what is the other?"

This is a good game for school, or home, or a party. Would you like to make cards and play it?

See if you can think of some other game you can play with the cards.

ZEROS IN SUBTRACTION

1. Frank wants to buy a knife that costs 75 cents. He has 45 cents. How much more does he need?

75	*Think, "5 and 0 are 5." Write 0.*
45	*Then think, "4 and 3 are 7." Write 3.*
30	*He needs 30 cents more.*

2. Helen wants to buy a doll that costs 98 cents. She has 60 cents. How much more does she need?

98	*Think, "0 and 8 are 8." Write 8.*
60	*Think, "6 and 3 are 9." Write 3.*
38	*She needs 38 cents more.*

3. Walter had 60 cents and spent 40 cents for a ball. How much did he have left?

60	*Think, "0 and 0 are 0." Write 0.*
40	*Think, "4 and 2 are 6." Write 2.*
20	*He had 20 cents left.*

4. Fred earned 75 cents and spent 35 cents for a present for his mother. How much did he have left?

Subtract:

5.	6.	7.	8.	9.	10.	11.
67	84	96	85	89	78	63
27	30	26	40	30	28	20

SUBTRACTION TABLE FOR STUDY

Study each fact and think what it means. Then cover the answers and see if you can say them.

You must know this table perfectly before you can do the next written subtraction.

10	10	10	10	10	10	10	10	10
3	7	2	8	4	6	5	1	9
7	3	8	2	6	4	5	9	1
11	11	11	11	11	11	11	11	12
2	9	7	3	5	6	4	8	3
9	2	4	8	6	5	7	3	9
12	12	12	12	12	12	13	13	13
6	9	7	4	8	5	4	9	7
6	3	5	8	4	7	9	4	6
13	13	13	14	14	14	14	14	15
8	5	6	5	8	6	9	7	6
5	8	7	9	6	8	5	7	9
15	15	15	16	16	16	17	17	18
8	9	7	7	9	8	8	9	9
7	6	8	9	7	8	9	8	9

Play a game with these facts. Write all on the blackboard without the answers. Choose some one to say the answers. If the one chosen gives a wrong answer, say, "Tag." See who can give all without being tagged.

WRITTEN SUBTRACTION WITH CARRYING

1. Mary wants a doll that costs 42¢. She has 28¢. How much more does she need?

42 *Think, "8 and 4 are 12." Write 4. Carry 1 to 2.*
28 *Think, "3 and 1 are 4." Write 1.*
14 *She needs 14¢ more.*

Prove the answer by finding the sum of 14 and 28.
Think, "4 and 8 are 12." Carry 1 to 1.
Think, "2 and 2 are 4." 42 is the sum of 14 and 28.

When the number in any column is less than the one below it, think what added to the lower number will make a sum that ends in the number above, and carry 1.

In Problem 1, the number 4 added to 8 made 12, a sum that ended in 2, and 1 was carried.

2. Practice on page 38. Cover the 1's by columns. In column one, think "7 and 3 make 10, a sum that ends in 0"; "9 and 2 make 11, a sum that ends in 1"; and so on.

Subtract:

3.	4.	5.	6.	7.	8.	9.
62	71	80	53	94	46	65
27	37	47	27	47	17	37
10.	**11.**	**12.**	**13.**	**14.**	**15.**	**16.**
60	75	87	44	73	92	61
28	48	18	28	58	48	28

PRACTICE IN WRITTEN SUBTRACTION

Subtract and check by adding:

1.	2.	3.	4.	5.	6.	7.
90	81	63	72	41	63	80
36	47	28	38	17	29	44

8.	9.	10.	11.	12.	13.	14.
65	71	83	64	52	60	71
29	36	25	26	29	35	26

15.	16.	17.	18.	19.	20.	21.
82	93	46	54	81	65	84
47	27	18	27	46	28	39

22.	23.	24.	25.	26.	27.	28.
76	31	58	95	86	78	43
57	18	29	49	29	39	17

29.	30.	31.	32.	33.	34.	35.
67	84	40	50	60	70	90
28	55	16	34	25	48	37

36.	37.	38.	39.	40.	41.	42.
80	100	100	100	100	100	100
29	31	26	82	75	38	44

43. Frank had \$1.00 and spent \$0.48 of it. How much had he left?

SHOPPING PROBLEMS

Knife	45¢	Doll	65¢
Ball	38¢	Doll's table	69¢
Skates	95¢	Doll's hat	17¢
Saw	78¢	Doll's chair	42¢

1. How much will a knife and a ball cost?

2. How much will a doll and a doll's hat cost?

3. How much more will a pair of skates cost than a saw?

4. A doll's table will cost how much more than a chair?

5. A saw will cost how much more than a ball?

6. Frank has 78¢. How much more will he need to buy a pair of skates?

7. Lucile bought a chair and a hat for her doll. How much did both cost?

8. Walter has 45¢ and wants to buy a saw. How much more will he need?

9. Nell has 50¢. If she buys a doll's hat, how much will she have left?

10. Walter has 50¢. If he buys a ball, how much will he have left?

11. Mary has 85¢. If she buys a doll's table, how much will she have left?

12. Frank bought a ball for his brother, and a doll's chair for his sister. How much did both cost?

DRILL IN SUBTRACTION

Lay a strip of paper below any line of exercises and write the answers only. Then see if your answer added to the number above it gives the top number.

You should subtract any six of these in 2 minutes.

Subtract:

1.	2.	3.	4.	5.	6.
461	584	617	835	629	792
125	248	354	271	485	256

7.	8.	9.	10.	11.	12.
806	750	609	580	607	590
135	238	426	148	234	157

13.	14.	15.	16.	17.	18.
930	760	506	809	570	640
116	428	163	287	128	226

19.	20.	21.	22.	23.	24.
526	843	289	763	847	936
140	270	120	380	603	540

25.	26.	27.	28.	29.	30.
300	400	500	400	300	500
165	273	264	182	139	248

31.	32.	33.	34.	35.	36.
400	500	900	800	700	600
276	357	736	352	283	347

1. Frank went for a ride with his father. They drove 87 miles before noon and 106 miles after noon. How far did they drive?

2. Mary took an automobile trip with her parents. They drove 205 miles the first day and 176 miles the second day. How much farther did they drive the first day?

3. Walter earned $3.60 and spent $1.75 of it. How much had he left?

4. Ruth spent $0.95 for a present for her mother and $0.65 for a present for her sister. How much did both cost?

5. Ralph paid $1.20 for a hundred papers and sold them for $2.00. How much did he make?

6. One sled costs $6.25 and another $4.50. How much is saved by buying the cheaper one?

7. Helen is going with her parents from New York City to a little town in Maine that is 396 miles away. If they can drive 215 miles the first day, how much will that leave for the second day?

8. There are 96 pupils in the primary grades, 88 in the intermediate grades, and 76 in the advanced grades in the Hillside School. How many pupils in all grades?

9. A third grade class sold 436 tickets for an entertainment in their school. There were 600 seats in the assembly hall to be sold. How many more could have been sold?

THE DOUBLES IN THE ADDITION FACTS

1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9

1. Close your eyes and say, "Two 1's are 2; two 2's are 4"; and so on until you say all of them.

A NEW WAY TO WRITE THE DOUBLES

"Two 1's are 2" may be written $2 \times 1 = 2$.
"Two 2's are 4" may be written $2 \times 2 = 4$.

2. Write all the doubles in this new way. This is called the "2 times" table.

THE "2 TIMES" TABLE

$2 \times 1 = 2$	$2 \times 4 = 8$	$2 \times 7 = 14$
$2 \times 2 = 4$	$2 \times 5 = 10$	$2 \times 8 = 16$
$2 \times 3 = 6$	$2 \times 6 = 12$	$2 \times 9 = 18$

Cover the answers and see if you can write them.

USING THE "2 TIMES" TABLE

1. John bought two dozen oranges at 48¢ a dozen. Add 48 and 48 and find how much they cost.

When the numbers to add are alike, we find the answer this way:

48 *Think, "two 8's are 16." Write 6, carry 1.*
2 *Think, "two 4's are 8," then add the 1 to carry*
96 *and write 9.*

2. Nell bought two boxes of candy at 39¢ a box. Find the cost of both by adding, and by the new way.

This new way is called *multiplication*.

3. Fred earned 45¢ a day for two days, working after school. Find by addition and by multiplication how much he earned.

4. The second and third grade rooms each have 36 pupils. Find in two ways how many in both grades.

5. Mary bought two yards of ribbon costing 34¢ a yard. Find how much all cost.

Multiply:

6.	7.	8.	9.	10.	11.	12.
48	35	72	91	64	73	82
2	2	2	2	2	2	2

13.	14.	15.	16.	17.	18.	19.
95	74	83	96	89	67	84
2	2	2	2	2	2	2

20. Ralph bought two hens costing $1.35 each. Find how much both cost.

21. Walter sold two bushels of apples at $1.85 a bushel. Find how much he got for all.

22. Jack earned $2.40 a week for two weeks. How much did he earn in all?

MAKING A "3 TIMES" TABLE

1. *Find the sums:*

1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9

2. Be sure your sums are correct. Then look at them and say, "Three 1's are three; three 2's are six; three 3's are nine"; and so on until you say all of them.

"Three 2's are six" is written $3 \times 2 = 6$.

3. *Read and remember:*

$3 \times 1 = 3$	$3 \times 4 = 12$	$3 \times 7 = 21$
$3 \times 2 = 6$	$3 \times 5 = 15$	$3 \times 8 = 24$
$3 \times 3 = 9$	$3 \times 6 = 18$	$3 \times 9 = 27$

4. *Give the missing number:*

$3 \times ? = 9$	$3 \times ? = 6$	$3 \times ? = 18$
$3 \times ? = 3$	$3 \times ? = 15$	$3 \times ? = 27$
$3 \times ? = 12$	$3 \times ? = 24$	$3 \times ? = 21$

USING THE "3 TIMES" TABLE

1. Frank sold 36 papers each day for three days. Find how many he sold.

36	*Think, "3 × 6 = 18." Write 8, carry 1.*
3	*Think, "3 × 3 = 9." Then add 1 to 9*
108	*and write 10.*

2. Mary's brother earned $48 a month for the three months of his vacation. How much did he earn?

$48	*Think, "3 × 8 = 24." Write 4, carry 2.*
3	*Think, "3 × 4 = 12." Add 2 to 12 and*
$144	*write 14.*

Multiplication saves adding when the numbers to add are all alike.

Multiply:

3.	4.	5.	6.	7.	8.	9.
74	31	85	43	96	68	75
3	3	3	3	3	3	3

10.	11.	12.	13.	14.	15.	16.
468	921	726	981	792	485	756
3	3	3	3	3	3	3

PROBLEMS

1. John sold 3 bushels of apples at $2.70 a bushel. How much did he get for them?

$2.70	*Think, "three 0's are 0." Write 0.*
3	*Think, "three 7's are 21." Write 1,*
$8.10	*carry 2.*

Think, "three 2's are 6." Add 2, and write 8.
To prove it, write $2.70 down three times and add.

2. At the rate of 24 miles an hour, how far can Walter's father drive in 3 hours?

3. When oranges are \$0.45 a dozen, how much will 3 dozen cost?

Do not forget to point off two places for cents in the answer.

4. When steak is 39¢ a pound, how much will 3 pounds cost?

Before multiplying, write 39¢ as \$0.39.

5. Helen gathered 3 dozen roses from her garden and sold them for 35¢ a dozen. How much did she get for them?

6. Helen's father bought 3 barrels of apples at \$6.40 a barrel. How much did he pay for all?

7. Helen went to the store for her mother and bought 3 pounds of butter at 54¢ a pound. How much did it cost?

8. Mary picked up 3 baskets of apples which her father let her sell. She sold them for \$1.35 a basket. How much did she get for all?

9. Frank had 3 rabbits. He was offered \$1.85 apiece for them. How much could he have gotten for all?

10. Henry raised 3 baskets of carrots which he sold at \$0.85 per basket. How much did he get for all?

PROBLEMS

1. At 5 cents each, how much will 3 oranges cost?

2. At 4 cents each, how much will 3 apples cost?

3. If there are 6 desks in each row, how many desks in 3 rows?

4. If a large orange costs 7 cents, how much will 3 oranges cost?

5. How much will 3 two-cent stamps cost?

6. Nell wants to buy 3 Christmas cards. They cost 9 cents each. How much will 3 cost?

7. Helen gets 8 cents each day for drying the dishes. How much can she earn in 3 days?

8. Frank can ride his bicycle 8 miles in an hour. If he can ride this fast for 3 hours, how far can he ride?

9. Mary's mother bought 3 hens weighing 5 pounds each. How much did the 3 weigh?

10. During 3 weeks of his vacation Robert earned 8 dollars per week. How much did he earn in 3 weeks?

11. Ruth wants to make each of 3 friends 6 paper dolls. How many must she make?

12. Henry planted 3 rows of tulip bulbs with 9 bulbs in a row. How many bulbs did it take?

PROBLEMS

1. At 2¢ each, tell the cost of 5 sticks of candy; of 6 sticks; of 7 sticks; of 8 sticks; of 9 sticks.

2. When apples are 3¢ each, tell the cost of:

5 apples 8 apples 6 apples 9 apples 7 apples

3. For 10¢ how many 2-cent pencils can you buy?

4. For 12¢ how many 2-cent stamps can you buy?

5. For 6¢ how many 3-cent pencils can you buy?

6. How many 3-cent apples can you buy for 9 cents? For 12 cents? For 15 cents? For 18 cents?

7. Think of something you can buy for 2 cents. Then tell how many you can buy for:

12¢ 10¢ 14¢ 8¢ 16¢ 6¢ 18¢

8. Think of something you can buy for 3 cents. Then tell how many you can buy for:

15¢ 9¢ 18¢ 12¢ 21¢ 27¢ 24¢

A REVIEW OF MULTIPLICATION

Give the missing number:

1.	2.	3.
$? \times 2 = 10$	$3 \times ? = 9$	$? \times 2 = 6$
$? \times 4 = 12$	$? \times 8 = 16$	$4 \times ? = 8$
$3 \times ? = 18$	$? \times 3 = 27$	$2 \times ? = 14$
$2 \times ? = 12$	$7 \times ? = 21$	$2 \times ? = 16$
$? \times 5 = 15$	$? \times 6 = 18$	$? \times 9 = 18$
$5 \times ? = 10$	$3 \times ? = 12$	$3 \times ? = 21$
$3 \times ? = 24$	$? \times 6 = 12$	$? \times 9 = 27$
$2 \times ? = 4$	$8 \times ? = 24$	$? \times 7 = 14$

A NEW THING TO LEARN IN MULTIPLICATION

You have learned the "2 times" and "3 times" tables. From these you can learn some new facts.

1. How did you find 3×4?
2. Then how can you find 4×3? Find it.

You knew that $3 \times 4 = 12$.
You found that $4 \times 3 = 12$.

3. How did you find 3×5?
4. Then how can you find 5×3? Find it.

You knew that $3 \times 5 = 15$.
You found that $5 \times 3 = 15$.

5. *Tell the missing numbers:*

$2 \times 3 = ?$ $2 \times 5 = ?$ $2 \times 9 = ?$ $3 \times 7 = ?$
$3 \times 2 = ?$ $5 \times 2 = ?$ $9 \times 2 = ?$ $7 \times 3 = ?$

$2 \times 4 = ?$ $2 \times 6 = ?$ $3 \times 6 = ?$ $3 \times 8 = ?$
$4 \times 2 = ?$ $6 \times 2 = ?$ $6 \times 3 = ?$ $8 \times 3 = ?$

$2 \times 8 = ?$ $3 \times 9 = ?$
$8 \times 2 = ?$ $9 \times 3 = ?$

6. At 8¢ each, how much will 2 tops cost?
7. At 2¢ each, how much will 8 tops cost?
8. At 9¢ each, how much will 3 things cost?
9. At 3¢ each, how much will 9 things cost?
10. At 8¢ each, how much will 3 oranges cost?
11. At 3¢ each, how much will 8 lemons cost?

THE "4 TIMES" TABLE

1. *Things you know:*

$1 \times 4 =$	$2 \times 4 =$	$3 \times 4 =$
$4 \times 1 =$	$4 \times 2 =$	$4 \times 3 =$

2. *New facts to find:*

4	5	6	7	8	9
4	5	6	7	8	9
4	5	6	7	8	9
4	5	6	7	8	9

3. *New things to write:*

$4 \times 4 =$	$4 \times 6 =$	$4 \times 8 =$
$4 \times 5 =$	$4 \times 7 =$	$4 \times 9 =$

4. *New facts from the "4 times" table:*

$5 \times 4 =$ $6 \times 4 =$ $7 \times 4 =$ $8 \times 4 =$ $9 \times 4 =$

5. *Give the missing number:*

$? \times 4 = 16$ $? \times 4 = 24$ $? \times 4 = 28$ $? \times 4 = 36$
$4 \times ? = 20$ $4 \times ? = 12$ $4 \times ? = 32$ $4 \times ? = 8$

6. At 5 cents each, how much will 4 oranges cost?

7. *Read and remember:*

$4 \times 1 = 4$	$4 \times 4 = 16$	$4 \times 7 = 28$
$4 \times 2 = 8$	$4 \times 5 = 20$	$4 \times 8 = 32$
$4 \times 3 = 12$	$4 \times 6 = 24$	$4 \times 9 = 36$

8. *From the "4 times" table give:*

$1 \times 4 =$	$4 \times 4 =$	$7 \times 4 =$
$2 \times 4 =$	$5 \times 4 =$	$8 \times 4 =$
$3 \times 4 =$	$6 \times 4 =$	$9 \times 4 =$

USING THE "4 TIMES" TABLE

1. Frank gets \$1.45 each week for delivering papers. How much can he earn in 4 weeks?

\$1.45 4 \$5.80	*Think, "4 × 5 = 20." Write 0, carry 2. Think, "4 × 4 + 2 = 18." Write 8, carry 1. Think, "4 × 1 + 1 = 5." Write 5.*

2. Ralph sold 4 rabbits at \$1.85 each. How much did he get for them?

3. Walter sold 4 baskets of apples for 95 cents a basket. How much did he get for them?

\$0.95 4 \$3.80	*Before multiplying, write 95 cents \$0.95. Be sure to put a period between dollars and cents in the answer.*

4. At 65 cents a yard, how much will 4 yards of ribbon cost?

Multiply:

5.	6.	7.	8.	9.
\$2.46 4	\$1.98 4	\$1.67 4	\$2.19 4	\$3.28 4

10.	11.	12.	13.	14.
279 4	368 4	547 4	693 4	248 4

REVIEWING MULTIPLICATION—DIVISION

In $3 \times 4 = 12$, 3 and 4 are called the **factors**, and 12 is called the **product**.

Give the missing factor:

1.	2.	3.	4.
$? \times 4 = 8$	$? \times 5 = 20$	$2 \times ? = 6$	$? \times 8 = 16$
$2 \times ? = 14$	$4 \times ? = 28$	$? \times 7 = 14$	$2 \times ? = 10$
$? \times 5 = 10$	$3 \times ? = 27$	$3 \times ? = 18$	$? \times 6 = 24$
$2 \times ? = 16$	$? \times 7 = 21$	$? \times 9 = 36$	$? \times 8 = 24$
$3 \times ? = 9$	$? \times 5 = 15$	$4 \times ? = 32$	$2 \times ? = 12$
$? \times 3 = 15$	$2 \times ? = 18$	$? \times 9 = 18$	$? \times 6 = 18$
$? \times 4 = 12$	$? \times 6 = 12$	$8 \times ? = 24$	$4 \times ? = 24$
$3 \times ? = 21$	$2 \times ? = 8$	$5 \times ? = 20$	$? \times 7 = 28$
$4 \times ? = 16$	$3 \times ? = 12$	$? \times 9 = 27$	$4 \times ? = 36$

The question asked by "$? \times 4 = 8$" is also asked by $4)\underline{8}$. The answer is written below.

$\begin{array}{r} 4)\underline{8} \\ 2 \end{array}$ *is read "8 divided by 4 equals 2."*

$8 \div 4 = 2$ *is also read "8 divided by 4 equals 2."*

When written in either form, this is called *division*.

Read these:

1.	2.	3.	4.	5.
$\begin{array}{r} 4)\underline{8} \\ 2 \end{array}$	$\begin{array}{r} 5)\underline{20} \\ 4 \end{array}$	$\begin{array}{r} 2)\underline{6} \\ 3 \end{array}$	$\begin{array}{r} 8)\underline{16} \\ 2 \end{array}$	$\begin{array}{r} 2)\underline{14} \\ 7 \end{array}$
$\begin{array}{r} 2)\underline{14} \\ 7 \end{array}$	$\begin{array}{r} 4)\underline{28} \\ 7 \end{array}$	$\begin{array}{r} 7)\underline{14} \\ 2 \end{array}$	$\begin{array}{r} 2)\underline{10} \\ 5 \end{array}$	$\begin{array}{r} 3)\underline{18} \\ 6 \end{array}$

LEARN AND REMEMBER

$2 \div 2 = 1$	$3 \div 3 = 1$	$4 \div 4 = 1$
$4 \div 2 = 2$	$6 \div 3 = 2$	$8 \div 4 = 2$
$6 \div 2 = 3$	$9 \div 3 = 3$	$12 \div 4 = 3$
$8 \div 2 = 4$	$12 \div 3 = 4$	$16 \div 4 = 4$
$10 \div 2 = 5$	$15 \div 3 = 5$	$20 \div 4 = 5$
$12 \div 2 = 6$	$18 \div 3 = 6$	$24 \div 4 = 6$
$14 \div 2 = 7$	$21 \div 3 = 7$	$28 \div 4 = 7$
$16 \div 2 = 8$	$24 \div 3 = 8$	$32 \div 4 = 8$
$18 \div 2 = 9$	$27 \div 3 = 9$	$36 \div 4 = 9$

Give the missing number:

1.	2.	3.	4.
$? \div 2 = 4$	$? \div 3 = 5$	$? \div 2 = 5$	$? \div 3 = 2$
$? \div 3 = 4$	$? \div 4 = 6$	$? \div 3 = 3$	$? \div 4 = 4$
$? \div 4 = 5$	$? \div 2 = 8$	$? \div 4 = 2$	$? \div 2 = 6$
$? \div 3 = 6$	$? \div 3 = 7$	$? \div 2 = 7$	$? \div 4 = 9$
$? \div 4 = 8$	$? \div 4 = 7$	$? \div 4 = 3$	$? \div 2 = 3$
$? \div 2 = 9$	$? \div 3 = 9$	$? \div 4 = 1$	$? \div 3 = 8$

PROBLEMS

1. Frank has 16¢. At 2¢ each, how many marbles can he buy?

2. Helen paid 16¢ for 2 writing pads. How much was that for each?

3. Walter paid 24¢ for 3 tops. How much was that for each?

4. Nell has 18¢. How many picture post cards at 3¢ each can she buy with it?

PROBLEMS IN MULTIPLICATION AND DIVISION

1. Mary saw some nice apples that cost 4 cents each. How much will 6 cost?

2. Ann has 16 cents. How many apples at 4 cents each can she buy?

3. John gave 20¢ for 4 oranges. How much was that for each?

4. Frank saw some tops that cost 9 cents each. How much will 4 cost?

5. Ned paid 32 cents for 4 tops. How much was that for each?

6. Nell has 32 cents. How many Christmas cards can she buy at 4 cents each?

7. Ruth paid 24 cents for 6 Christmas cards. How much was that for each?

8. When large apples are 5 cents each, how much will 4 cost?

9. John paid 36 cents for 4 peanut bars. How much was that for each?

10. When pears are 3 cents each, how many can be bought for 15 cents?

11. Helen got a box of candy for 24 cents. There were 8 pieces in the box. What was the cost of each piece?

12. Dorothy has 18 roses that she wants to make into 3 bouquets of equal size. How many can she put in each?

A MAKE-BELIEVE SALE

These children are playing that they are grown-ups and are having a sale. They use play money. The articles for sale are "make-believe" from old toys and pictures they have cut from magazines.

1. Helen bought a string of beads for $1.35 and gave the clerk $2.00. How much change should she get?

2. Nell bought a doll for 95¢ and an apron for 65¢. How much did both cost?

3. Ruth is going to buy 3 yards of lace at 85¢ a yard. How much will it cost?

4. Nell has $3.00. If she buys a doll costing $1.65, how much will she have left?

5. Mary wants to buy 4 pairs of stockings that cost $1.75 a pair. How much will they cost?

6. Dorothy bought a chair for $1.35, an apron for 65¢, and a yard of lace costing $1.00. How much did all cost?

FIRST WRITTEN DIVISION

1. Ruth has 48 cents to spend for little cakes for her party. How many can she buy at 2 cents each?

2)48 24	*Begin at the left. Divide each number by 2.* *Think, "4 ÷ 2 = 2." Write 2 below 4.* *Then think, "8 ÷ 2 = 4." Write 4 below 8.*

2. Frank paid 84 cents for 2 baseballs. How much was that for each?

2)84	*Think, "8 ÷ 2 = 4." Write 4 below 8.*
42	*Think, "4 ÷ 2 = 2." Write 2 below 4.*

3. Some boys have 69 cents to spend for apples. How many can they buy at 3 cents each?

Divide:

4.	5.	6.	7.	8.	9.
3)96	2)68	4)84	2)82	3)63	2)62
10.	**11.**	**12.**	**13.**	**14.**	**15.**
3)156	4)128	2)124	3)129	4)168	3)189

16. At 4 cents each, find how many oranges you can buy for 84 cents.

17. At 3 cents each, find how many apples you can buy for 93 cents.

SECOND WRITTEN DIVISION

1. John paid 96¢ for 2 little rabbits. How much was that for each?

$$\begin{array}{r} 2)\overline{96} \\ 48 \end{array}$$

Think, "8 ÷ 2 = 4, so 9 ÷ 2 = 4 and 1 not divided." Write 4 under 9.

Then think, "the 1 of 9 not divided and 6 to the right of 9 make 16 to divide."

Think, "16 ÷ 2 = 8." Write 8 under 6.

2. Frank paid 75 cents for 3 pounds of nuts. How much was that for a pound?

$$\begin{array}{r} 3)\overline{75} \\ 25 \end{array}$$

Think, "7 ÷ 3 = 2 and 1 not divided." Write 2.

Then think, "1 and 5 to the right of it is 15; 15 ÷ 3 = 5." Write 5.

3. Walter has 36 cents that he wants to share equally with his sister. How much must he give her?

4. Mary paid 56¢ for 2 yards of ribbon. How much was that for a yard?

Divide:

5.	6.	7.	8.	9.	10.
2)36	2)58	2)76	2)92	2)78	2)98
11.	**12.**	**13.**	**14.**	**15.**	**16.**
3)45	3)48	3)72	3)78	3)51	3)57

DRILL EXERCISES IN DIVISION

You saw that to divide 75 by 3 you had to think, "7 ÷ 3 = 2 and 1 not divided." The 2 is called the **quotient**, and the 1 is called the **remainder**.

Before you can do written division quickly you must be able to give the quotient and the remainder of each of these quickly.

DRILL TABLE

Give quotient and remainder:

1.	2.	3.	4.	5.
2)5	2)11	3)19	3)5	3)14
2)9	2)15	3)25	3)29	3)11
2)7	3)4	3)28	3)17	3)26
2)13	3)7	3)10	3)20	3)8
2)17	3)13	3)16	3)23	4)7

6.	7.	8.	9.	10.
4)5	4)21	4)37	4)14	4)35
4)9	4)29	4)23	4)34	4)22
4)17	4)33	4)18	4)26	4)31
4)25	4)6	4)30	4)11	4)15
4)13	4)10	4)19	4)38	4)27

EXERCISES IN DIVISION

Divide:

1.	2.	3.	4.	5.	6.
2)96	2)108	2)116	2)134	2)156	2)192
7.	**8.**	**9.**	**10.**	**11.**	**12.**
2)126	2)178	2)150	2)130	2)148	2)188
13.	**14.**	**15.**	**16.**	**17.**	**18.**
3)126	3)135	3)105	3)162	3)144	3)171
19.	**20.**	**21.**	**22.**	**23.**	**24.**
3)168	3)156	3)189	3)108	3)198	3)177
25.	**26.**	**27.**	**28.**	**29.**	**30.**
4)128	4)136	4)156	4)160	4)168	4)172
31.	**32.**	**33.**	**34.**	**35.**	**36.**
4)208	4)216	4)196	4)144	4)148	4)216

PROBLEMS

1. A third-grade class has $1.36 to buy colored bells to decorate the room and tree for a Christmas party. At 4¢ each, how many can they buy?

4)136
34

Before dividing dollars and cents by cents, remove the dollar sign and period and divide as shown here.

They can buy 34 bells.

2. At 3¢ each, how many bells could they have bought for $1.35?

3. A class wants to buy some apples for a Hallowe'en party. At 3¢ each, how many can they buy for $1.74?

4. George took in $2.16 for radishes that he sold for 4¢ a bunch. How many bunches did he sell?

5. Some children sold lemonade at 3¢ a glass and took in $1.95. How many glasses did they sell?

6. Mary paid $1.44 for a 4-pound roast for her mother. How much a pound was that?

4)$1.44 $0.36	*Divide as if you were dividing 144, but be sure to put the dollar sign and a period in the answer.*

7. Three boys went on a hike and shared the expense equally. The trip cost $1.35. How much was that for each?

8. Mrs. Brown bought a 3-yard remnant of cloth costing $2.55. How much a yard did it cost?

9. Frank earned $4.05 on a paper route in 3 weeks. How much was that a week?

10. Charles sold 4 hens for $5.40. How much was that for each?

11. Nell picked 3 baskets of tomatoes which she sold for $2.25. How much a basket did she get for them?

REVIEWING ADDITION

1. Frank found 34 eggs one day, 21 the next day, and 14 the third day. How many did he find in three days?

34	
21	*Add as when you add dimes and cents.*
14	*Adding down, think, "4, 5, 9." Write 9.*
69	*Adding down, think, "3, 5, 6." Write 6.*

In numbers like 34, 3 is the number of **tens** and 4 is the number of **ones,** just as 34¢ is 3 dimes and 4 cents.

2. There are 48 pupils in the second grade and 36 in the third grade of the Hillside School. How many in both grades?

48	*Think, "8, 14; or 1 ten and 4 ones." Write*
36	*4, carry 1 ten. Carrying 1, think, "1, 5, 8."*
84	*Write 8.*

3.	4.	5.	6.	7.	8.	9.
12	23	17	21	32	18	16
26	16	22	26	16	30	40
15	48	16	17	25	24	18

10.	11.	12.	13.	14.	15.	16.
24	35	43	17	24	16	25
17	17	19	27	18	25	17
28	24	16	14	24	34	34

READING LARGER NUMBERS: FOUR PLACES

1. A number one more than 99 is 100, and is read "one hundred." 200 is read "two hundred."

Read: 300; 400; 500; 600; 700; 800; 900.

2. 230 is read "two hundred thirty." Read: 240; 270; 320; 430; 560; 780; 690; 580; 930; 190.

3. 165 is read "one hundred sixty-five."

Read: 238; 342; 576; 897; 685; 895; 999.

4. 304 is read "three hundred four."

Read: 506; 708; 903; 601; 803; 905.

5. A number one more than 999 is 1000, and is read "one thousand." Read: 2000; 3000; 4000; 5000.

6. 2600 is read "two thousand six hundred." Read: 3500; 4300; 6700; 8500; 9300; 7800; 6900.

7. See if you can read these: 2536; 3475; 6387; 9360; 6765; 7980.

DRILL IN ADDITION

Add and read the sums:

8.	9.	10.	11.	12.	13.
231	528	631	432	785	530
425	361	545	741	610	845
713	610	723	625	405	902

14.	15.	16.	17.	18.	19.
358	437	568	634	826	435
420	518	427	528	347	215
501	201	310	321	516	426

REVIEWING SUBTRACTION

1. John weighs 62 pounds and his little brother weighs only 34 pounds. How much more does John weigh?

Write the larger number above the other.
62 *Since 2 is less than 4, think, "4 and 8 are 12."*
34 *Write 8, carry 1 to 3.*
28 *Think, "4 and 2 are 6." Write 2.*
Add 28 and 34 and see if they make 62.

2. Walter had 42 marbles and lost all but 27 of them. How many did he lose?

3. There are 72 pupils in the third grade of Hillside School. 38 of them are girls. How many boys?

Subtract:

4.	5.	6.	7.	8.	9.	10.
42	34	51	42	53	56	65
16	18	26	25	27	29	38

11.	12.	13.	14.	15.	16.	17.
72	85	96	85	82	68	76
48	37	49	49	47	29	28

18.	19.	20.	21.	22.	23.	24.
96	61	62	91	75	87	48
38	19	48	48	29	28	19

SHOPPING PROBLEMS

1. James looked at two different sizes of the Gilbert Wheel Toy. The price of the small size was $5.47, and of the large size $8.95. How much more does the large one cost?

2. Frank wants to buy a large size Gilbert Wheel Toy costing $8.95. He has $5.67. How much more money does he need?

3. Mary's father bought her little four-year-old brother a hobbyhorse costing $5.76, and a Two-in-One set of wagon blocks costing $1.48. How much did both cost?

4. How much more did the hobbyhorse cost than the blocks?

5. Helen has $2.35. She wants to buy her little brother a train of cars that costs $1.48. If she does, how much money will she have left?

6. Mr. Brown bought his little boy a Kiddie Racer costing $1.47 and a hobbyhorse costing $1.79. How much did both cost?

7. Lucile's mother is going to buy her a doll for Christmas. She looked at one costing $3.25 and at a smaller one costing $2.38. How much can she save by buying the smaller one?

8. Dorothy saw a doll costing $2.18 that she wants to buy. She has but $1.35 in her bank. How much more does she need?

PRACTICE EXERCISES IN SUBTRACTION

See how quickly you can subtract these.

After subtracting, see if your answer added to the number above makes the number at the top.

1.	2.	3.	4.	5.	6.
486	597	684	926	845	936
128	249	126	384	193	473

7.	8.	9.	10.	11.	12.
560	708	980	780	906	840
128	243	526	345	435	527

13.	14.	15.	16.	17.	18.
926	847	763	956	721	936
348	269	178	479	248	357

19.	20.	21.	22.	23.	24.
803	720	910	806	930	804
286	348	457	369	585	648

HALVES, THIRDS, AND FOURTHS

1. Nell had a nice large apple which she cut into 2 equal pieces. She gave Ann one of the two equal pieces.

Instead of saying, "One of the two equal pieces" we say "one half."

One half is written $\frac{1}{2}$.

2. Frank cut an apple into 3 equal pieces and kept one of the three equal pieces and gave away two of them.

Instead of saying, "One of the three equal pieces" we say "one third." For "Two of the three equal pieces" we say "two thirds."

One third is written $\frac{1}{3}$.

Two thirds is written $\frac{2}{3}$.

3. Helen cut an apple into 4 equal parts. One of the 4 equal parts is called "one fourth." Three of them is called "three fourths."

One fourth is written $\frac{1}{4}$.

Three fourths is written $\frac{3}{4}$.

4. Fold a sheet of paper so you can divide it into two halves.

5. Make a line on the blackboard and then erase one half of it.

6. Draw a line 6 inches long. Erase one half of it. How many inches did you erase?

7. Draw a line 9 inches long. Divide it into thirds. How long is each third of the line?

8. Fold a sheet of paper so as to divide it into fourths.

9. Draw a line 8 inches long. Divide it into fourths. How long is each fourth?

FINDING ONE HALF OF A NUMBER

1. *Say the missing number:*

$2 \times ? = 10$	$2 \times ? = 2$	$2 \times ? = 8$
$2 \times ? = 4$	$2 \times ? = 6$	$2 \times ? = 14$
$2 \times ? = 12$	$2 \times ? = 16$	$2 \times ? = 18$

2. The question asked by "$2 \times ? = 10$" is, "What is one of the two equal numbers that make 10?"

Instead of saying, "One of the two equal numbers that make 10 is 5," we say, "One half of 10 is 5."

This is written $\frac{1}{2}$ of 10 = 5.

3. Instead of writing $2 \times ? = 12$, we may write

$\frac{1}{2}$ *of* $12 = ?$

4. *Give the answers:*

$\frac{1}{2}$ of $4 = ?$	$\frac{1}{2}$ of $2 = ?$	$\frac{1}{2}$ of $12 = ?$
$\frac{1}{2}$ of $8 = ?$	$\frac{1}{2}$ of $6 = ?$	$\frac{1}{2}$ of $18 = ?$
$\frac{1}{2}$ of $16 = ?$	$\frac{1}{2}$ of $10 = ?$	$\frac{1}{2}$ of $14 = ?$

To find one half of a number, we divide by 2.

5. Frank had 48¢ and spent half of it. How much did he spend?

$2\overline{)48¢}$ $24¢$

To find $\frac{1}{2}$ of a number, divide by 2.
So think, "4 ÷ 2 = 2." Write 2.
Think, "8 ÷ 2 = 4." Write 4.

6. *Find one half of:*

28 42 86 64 82

7. *Find:*

$2\overline{)38¢}$ $2\overline{)72¢}$ $2\overline{)94¢}$ $2\overline{)56¢}$ $2\overline{)78¢}$ $2\overline{)96¢}$

8. Frank has 36¢ and wants to share it equally with his sister. Find half of 36¢.

9. John paid 76¢ for 2 pounds of steak for his mother. One pound cost half of 76¢. Find it.

FINDING ONE THIRD OF A NUMBER

1. *Give the missing number:*

3 × ? = 3	3 × ? = 9	3 × ? = 18
3 × ? = 6	3 × ? = 15	3 × ? = 27
3 × ? = 12	3 × ? = 24	3 × ? = 21

2. "3 × ? = 15" asks, "What is one of the three equal numbers that make 15?"

You have learned that "one of the three equal parts of an apple" is called "$\frac{1}{3}$ of an apple." One of the three equal parts of anything is $\frac{1}{3}$ of it.

$\frac{1}{3}$ of 6 = 2, $\frac{1}{3}$ of 12 = 4.

3. *Give the answers:*

$\frac{1}{3}$ of 3 = ?	$\frac{1}{3}$ of 9 = ?	$\frac{1}{3}$ of 18 = ?
$\frac{1}{3}$ of 6 = ?	$\frac{1}{3}$ of 15 = ?	$\frac{1}{3}$ of 27 = ?
$\frac{1}{3}$ of 12 = ?	$\frac{1}{3}$ of 24 = ?	$\frac{1}{3}$ of 21 = ?

To get one third of a number, we divide it by 3.

4. John has 12 marbles. He wants to give $\frac{1}{3}$ of them to his brother. How many must he give him?

5. Frank rode his bicycle 18 miles in 3 hours. If he rode $\frac{1}{3}$ of the distance each hour, how many miles did he ride each hour?

6. Mary spent 72 cents for 3 yards of ribbon. That was how much for one yard or $\frac{1}{3}$ of it?

7. Nell gathered 48 sweet peas. She wishes to give $\frac{1}{3}$ of them to each of three friends. How many can she give each?

FINDING ONE FOURTH OF A NUMBER

1. *Give the missing number:*

$4 \times ? = 4$	$4 \times ? = 8$	$4 \times ? = 12$
$4 \times ? = 16$	$4 \times ? = 20$	$4 \times ? = 24$
$4 \times ? = 28$	$4 \times ? = 32$	$4 \times ? = 36$

2. "$4 \times ? = 16$" asks, "What is one of the four equal numbers that make 16?"

Just as one of the four equal parts of an orange is $\frac{1}{4}$ of it, so one of the four equal numbers that make 16 is $\frac{1}{4}$ of 16.

3. *Give the answers:*

$\frac{1}{4}$ of 4 = ?	$\frac{1}{4}$ of 8 = ?	$\frac{1}{4}$ of 28 = ?
$\frac{1}{4}$ of 20 = ?	$\frac{1}{4}$ of 24 = ?	$\frac{1}{4}$ of 12 = ?
$\frac{1}{4}$ of 32 = ?	$\frac{1}{4}$ of 16 = ?	$\frac{1}{4}$ of 36 = ?

We find one fourth of a number by dividing it by 4.

4. Mr. Brown paid 4 boys $2.60 for picking up a load of potatoes. If the boys share the money equally, how much will each get?

4)$2.60 $0.65	*Be sure to write a period in the answer to show that it means cents. $0.65 = 65¢.*

5. Jane has 72 pansy plants which she wants to put in 4 equal beds. How many should she put in each bed?

6. Four girls gave a party and shared the expenses equally. The total expense was $9.36. How much did it cost each?

7. Frank is making four tulip beds. He has 136 bulbs. If he wants to put the same number in each bed, how many can he plant in each?

Divide:

8.	**9.**	**10.**	**11.**	**12.**
4)92	4)132	4)176	4)216	4)364
13.	**14.**	**15.**	**16.**	**17.**
4)228	4)316	4)372	4)196	4)272

TESTS IN ADDITION

Do not copy the figures. Lay a piece of paper below each and write the sum on that.

Test A

You should write all 24 sums in 40 seconds.

6	7	5	7	8	9	6	8	9	5	7	7
7	9	7	8	6	6	5	5	8	9	5	6
8	5	8	9	9	5	6	8	8	9	7	4
7	6	6	5	7	8	9	9	8	9	4	9

Test B

You should add all 10 in 2 minutes.

3	7	8	5	6	5	7	2	9	1
9	2	1	3	8	2	6	7	8	5
4	6	5	4	4	7	9	3	2	6
8	8	7	9	3	6	2	8	4	5
6	3	6	7	9	5	3	7	5	8

Test C

You should add all 8 in 3 minutes.

46	38	59	64	73	64	82	91
73	84	67	48	39	68	47	38
54	63	92	84	65	73	24	86
48	56	37	65	34	29	58	45

TESTS IN SUBTRACTION

Test A

You should write the answers to all 20 in 40 seconds.

18	16	17	13	16	15	16	12	14	13
9	9	8	9	7	9	8	6	6	7
12	15	14	11	15	13	11	14	12	14
5	6	8	9	7	5	5	9	8	7

Test B

You should subtract all 16 in 3 minutes.

41	60	71	80	81	63	71	83
27	38	46	34	43	38	42	64
80	73	84	72	54	81	63	85
35	46	67	38	29	65	25	37

Test C

You should subtract all 18 in 5 minutes.

342	536	865	496	843	267
126	218	437	169	319	148
436	548	763	435	861	734
129	229	235	117	349	428
526	487	643	735	674	846
187	289	376	549	286	568

TESTS IN MULTIPLICATION

Test A

You should write the 22 products in 40 seconds.

1	3	4	5	4	6	5	7	4	3	2
2	3	2	3	4	4	2	2	3	2	2
6	6	9	8	8	7	9	7	8	5	9
2	3	4	2	4	3	2	4	3	4	3

Test B

You should find the 16 products in 3 minutes.

51	43	64	35	74	26	45	37
3	3	2	3	2	3	2	3
26	39	28	37	49	19	27	38
4	3	4	2	3	4	3	4

Test C

You should find all 12 products in 3 minutes.

192	750	619	385	816	650
2	3	4	4	3	4
430	560	720	380	290	470
3	2	4	2	3	2

Test D

You should find the six products in 2 minutes.

425	638	927	748	396	834
4	3	3	4	4	3

TESTS IN DIVISION

Test A

You should write all 18 quotients in 40 seconds.

2)12	2)18	2)10	3)18	4)28	3)15
2)8	3)9	4)16	4)36	3)24	4)24
4)32	4)20	2)14	3)21	3)27	3)12

Test B

You should find all 18 quotients in 4 minutes.

2)48	2)56	2)72	2)94	2)86	2)64
3)69	3)72	3)84	3)78	3)54	3)48
4)56	4)72	4)96	4)64	4)92	4)76

Test C

You should find all 10 of either set in 3 minutes.

3)576	3)465	3)723	3)534	3)852
4)584	4)732	4)572	4)936	4)976

Test D

3)267	3)435	3)564	3)474	3)723
4)356	4)532	4)872	4)656	4)724

Drill very frequently on these exercises until you do them in the time allowed.

WINTER SPORTS

1. These four boys own a large coaster for which they paid $12. They shared the cost equally. How much did it cost each?

2. They bought a pair of skis that cost $5 and shared the cost equally. How much did it cost each?

$4)\overline{\$5.00}$ $\$1.25$	*Since $5 ÷ 4 = $1 and $1 not divided, write $5 as $5.00, which means "$5 and no cents," and then divide.*

3. The boys had an accident and broke the coaster. It cost $3 to get it repaired, and they shared the cost equally. How much did it cost each?

4. One Saturday they rented the coaster to a party of boys for 4 hours at 30¢ an hour. How much rent did they get?

5. How much will each boy's share of the rent be?

PROBLEMS

1. Mr. Brown gave $2.25 to each of his three children. How much was that for all?

2. Mrs. Harris divided $9.60 equally among her three children. How much was that for each?

3. Frank spent $3.65 for a sled and $1.85 for a pair of skates. How much did both cost?

4. Walter is saving money to buy a coaster costing $5.85. He has $3.68. How much more does he need?

5. Donald earned $5.46 selling papers and gave one third of it to his mother. How much did he give her?

6. Helen has $5.75. If she spends $3.85 for books, how much will that leave?

7. A third-grade class wants to earn enough to buy three pictures for their room. At $4.65 each, how much will the three pictures cost?

8. Fred paid $6.45 for 3 hens. How much was that for each?

9. Mary bought a doll costing $2.98, and a doll's bed costing $1.15. How much did both cost?

10. Lucile is saving money to buy a little desk costing $5.40. She has $3.85. How much more will she need?

11. Mrs. Brown's three children are going to buy her a Christmas present costing $2.55. If they share the cost equally, how much will it cost each?

FINDING HOW MUCH WAS EARNED

Here are the weekly earnings of ten boys for four weeks. You ought to be able to add all ten and check them in 12 minutes.

Do not forget the $ and the period (.) to show that the answer is dollars and cents.

1.	2.	3.	4.	5.
$2.68	$1.75	$3.08	$2.68	$1.48
3.85	2.46	2.46	1.94	2.76
1.96	3.19	1.85	2.75	2.58
2.09	1.84	2.96	1.92	2.09

6.	7.	8.	9.	10.
$3.18	$1.82	$2.07	$3.01	$1.85
1.96	3.09	3.16	1.98	2.48
2.43	1.95	1.89	2.34	1.86
1.95	2.38	2.26	1.67	3.29

11. Walter earned $1.40 in 4 hours. That was an average of how much per hour?

12. Ned was paid 18¢ per hour for weeding the garden. He worked 2 hours on Monday, 4 hours on Wednesday, and 3 hours on Friday. How much did he earn each day? How much in all three days?

13. Nell gathered and sold eggs for her mother. Her mother let her keep 15¢ for each dozen sold. She sold 3 dozen on Monday, 2 dozen on Tuesday, 4 dozen on Wednesday. How much did she earn each day? How much in all three days?

PRACTICE EXERCISES IN ADDITION

See how many you can add in just 5 minutes. Try them again in two weeks and see how much you have gained in speed.

1.	2.	3.	4.	5.	6.
246	163	327	420	530	169
138	427	162	168	164	320
403	534	340	237	285	436
246	260	164	144	326	185

7.	8.	9.	10.	11.	12.
206	348	563	428	521	609
340	160	187	164	169	130
129	275	529	250	307	463
347	347	140	325	248	196

13.	14.	15.	16.	17.	18.
263	208	864	98	240	340
147	75	230	160	163	160
96	300	146	237	98	359
100	298	79	85	40	146

19.	20.	21.	22.	23.	24.
300	244	199	206	355	516
199	166	208	435	87	137
246	380	167	169	264	408
307	168	246	78	196	119

Practice on this page until you can add any 6 of them in 4 minutes.

REVIEWING SUBTRACTION FACTS

Here are 20 hard subtraction facts. Study them two minutes. Then cover the answers and write them.

16	14	12	14	13	15	13	11	16	13
7	6	3	7	5	8	4	3	8	6
9	8	9	7	8	7	9	8	8	7
15	12	11	14	17	11	15	12	13	12
6	6	5	5	8	4	7	5	7	4
9	6	6	9	9	7	8	7	6	8

WRITTEN SUBTRACTION

You should subtract any 12 of these and prove them in 6 minutes. They include the above facts.

1.	2.	3.	4.	5.	6.
496	564	782	574	643	845
137	326	523	267	215	228
7.	**8.**	**9.**	**10.**	**11.**	**12.**
736	816	569	738	758	842
243	532	184	165	364	616
13.	**14.**	**15.**	**16.**	**17.**	**18.**
916	784	876	816	935	627
451	535	281	443	617	452
19.	**20.**	**21.**	**22.**	**23.**	**24.**
783	825	936	817	526	634
137	244	789	362	148	478

PROBLEMS TO SOLVE

1. Frank's mother sent him to the store for a 4-pound roast. At 38¢ a pound, how much money should she give him to pay for it?

2. For a party, a class wants 4 dozen apples. At 45¢ a dozen, how much will they cost?

3. To trim a Christmas tree, a class wants 4 boxes of tinsel. At 27¢ a box, how much will it cost?

4. John saved 85¢ a week for 4 weeks to get money to buy a coaster. How much did he save?

5. Frank and his sister picked up 4 baskets of "windfall" apples, which they sold at 75¢ a basket. How much did they get for them?

6. Ralph kept hens and sold eggs. One week he sold 3 dozen at 76¢ a dozen. How much did he get for them?

7. Walter sold a 4-pound hen at 37¢ a pound. How much did he get for it?

8. Donald earns $1.85 a week delivering papers. How much will he earn in 4 weeks?

9. Mary went shopping with her mother. They bought 3 dolls to send to some cousins. The dolls cost $1.78 each. How much did the three cost?

10. John has a garden and sells vegetables. He sold 4 baskets of tomatoes at 65¢ a basket. How much did he get for them?

TELLING THE MISSING FACTOR

See how quickly you can give the missing factor:

1.	2.	3.	4.
$4 \times ? = 16$	$2 \times ? = 14$	$8 \times ? = 32$	$? \times 9 = 18$
$9 \times ? = 9$	$3 \times ? = 9$	$6 \times ? = 24$	$8 \times ? = 16$
$2 \times ? = 4$	$6 \times ? = 12$	$2 \times ? = 16$	$7 \times ? = 21$
$3 \times ? = 6$	$5 \times ? = 10$	$2 \times ? = 18$	$5 \times ? = 15$
$2 \times ? = 10$	$4 \times ? = 28$	$2 \times ? = 12$	$2 \times ? = 6$
$2 \times ? = 8$	$7 \times ? = 14$	$3 \times ? = 15$	$4 \times ? = 12$
$4 \times ? = 24$	$9 \times ? = 18$	$3 \times ? = 18$	$6 \times ? = 18$
$5 \times ? = 20$	$8 \times ? = 16$	$4 \times ? = 8$	$3 \times ? = 27$

A NUMBER RACE

Select any column. See who can write all the missing numbers most quickly. If you have any wrong answers, you lose the race.

1.	2.	3.	4.
$2 \times 7 = ?$	$2 \times 9 = ?$	$3 \times 8 = ?$	$? \times 8 = 16$
$? \times 4 = 12$	$3 \times ? = 12$	$2 \times ? = 16$	$3 \times 9 = ?$
$3 \times 6 = ?$	$3 \times 5 = ?$	$3 \times ? = 27$	$4 \times 6 = ?$
$2 \times 8 = ?$	$2 \times ? = 18$	$? \times 5 = 15$	$? \times 8 = 32$
$? \times 9 = 27$	$3 \times 7 = ?$	$? \times 9 = 36$	$3 \times 4 = ?$
$3 \times ? = 15$	$? \times 7 = 28$	$3 \times ? = 24$	$6 \times ? = 24$
$? \times 6 = 24$	$4 \times ? = 32$	$4 \times 9 = ?$	$4 \times 8 = ?$
$4 \times ? = 28$	$3 \times ? = 18$	$? \times 6 = 18$	$4 \times ? = 36$
$? \times 8 = 24$	$? \times 5 = 20$	$4 \times ? = 20$	$4 \times 5 = ?$
$? \times 9 = 18$	$3 \times ? = 21$	$4 \times 7 = ?$	$? \times 7 = 21$

LEARNING TO COUNT CHANGE

1. How many cents in a dime?

2. How many nickels in a dime? In a quarter? In a half-dollar?

3. How many dimes in a half-dollar?

4. John bought a knife that cost 38¢. He gave the clerk a half-dollar. How much change did the clerk give John?

> This is the way the clerk counted the change:
> *He picked up a cent and said "39"; and then another cent and said "40." Then he picked up a dime and said "50." He gave John the dime and the 2¢.*

5. Tell how the clerk counted the change when John bought a 42-cent ball and handed the clerk 50 cents.

6. When a 30-cent ball is bought show a very short way to count back the change from 50¢.

7. Mary bought a box of cakes that cost 12¢. She gave the clerk a quarter. How much change did she get back?

This is the way the clerk counted it:
He picked up 1¢ and said "13"; then another and said "14"; then another and said "15." Then he picked up a nickel and said "20"; and another and said "25." He gave Mary the 3¢ and 2 nickels, or 13¢.

8. From cardboard cut "play money" and mark some 1¢, some 5¢, some 10¢, some 25¢, some 50¢, and some $1; then play store and count back the change.

9. Play that you are clerk in a toy store. Tell what change you will give back from a 50-cent piece when the purchase is:

15¢ 30¢ 40¢ 25¢ 35¢ 45¢

10. Play that you are clerk in a candy store. Tell what change you will give back from a 50-cent piece and a 25-cent piece given in payment of the following purchases:

65¢ 60¢ 67¢ 58¢ 63¢ 55¢ 72¢

11. Mary bought a doll costing 85¢. She paid for it with a one-dollar bill. How much change should she receive?

12. Tell how much change you should receive from a one-dollar bill when making a purchase amounting to:

75¢ 65¢ 48¢ 85¢ 68¢ 58¢ 73¢ 29¢

REVIEWING MULTIPLICATION FACTS

See how quickly you can give the products:

1.	2.	3.	4.	5.
$4 \times 4 =$	$9 \times 1 =$	$2 \times 2 =$	$3 \times 2 =$	$2 \times 5 =$
$2 \times 4 =$	$4 \times 6 =$	$5 \times 4 =$	$2 \times 7 =$	$3 \times 3 =$
$6 \times 2 =$	$5 \times 2 =$	$4 \times 7 =$	$8 \times 4 =$	$6 \times 4 =$
$2 \times 8 =$	$2 \times 9 =$	$7 \times 2 =$	$2 \times 6 =$	$3 \times 5 =$
$3 \times 4 =$	$4 \times 2 =$	$9 \times 2 =$	$8 \times 2 =$	$7 \times 3 =$
$5 \times 3 =$	$2 \times 3 =$	$4 \times 3 =$	$6 \times 3 =$	$3 \times 9 =$
$3 \times 7 =$	$7 \times 4 =$	$3 \times 6 =$	$3 \times 8 =$	$4 \times 8 =$
$9 \times 4 =$	$4 \times 9 =$	$8 \times 3 =$	$4 \times 5 =$	$9 \times 3 =$

MULTIPLYING WITH 0 IN THE MULTIPLICAND

1. Find 3×208.

$$\begin{array}{r} 208 \\ \times\ \ 3 \\ \hline 624 \end{array}$$

Think, "3 × 8 = 24." Write 4. Carry 2.
Think, "3 × 0 = 0; 0 + 2 = 2." Write 2.
Think, "3 × 2 = 6." Write 6.

2. Find 4×307 and check by addition.
3. Find 3×609 and check by addition.
4. Find 4×340.

$$\begin{array}{r} 340 \\ \times\ \ 4 \\ \hline 1360 \end{array}$$

Think, "4 × 0 = 0." Write 0.
Think, "4 × 4 = 16." Write 6. Carry 1.
Think, "4 × 3 + 1 = 13." Write 13.

5. Find 4×260 and check by addition.

Find and check:

6.	7.	8.	9.	10.	11.
409	507	305	902	601	506
3	3	3	3	3	4
12.	**13.**	**14.**	**15.**	**16.**	**17.**
708	604	903	805	760	890
4	4	4	4	3	3
18.	**19.**	**20.**	**21.**	**22.**	**23.**
540	670	980	570	920	450
3	4	4	3	3	4

PROBLEMS

1. Mr. Harris drove his car an average of 238 miles a day on a 3-day trip. How far did he drive?

2. Harry sold an average of 560 papers each month for 4 months. How many did he sell?

3. John has an after-school job that pays him $2.85 a week. How much can he earn in 4 weeks?

4. Jack wants a bicycle costing $36.50. He has $28.35. How much more does he need?

5. Nell has $3.45 in her bank. If she takes out $1.95 to buy Christmas presents, how much will she have left?

6. Frank earned $10.60 in 4 weeks. How much did he average per week?

PROBLEMS

Sleds	$3.85	Toy sewing machines	$3.60
Skates	$1.90	Large dolls	$1.78
Erectors	$5.68	Doll's table set	$2.36

1. John has $5. If he buys a sled, how much money will he have left?

Write $5 as $5.00 before subtracting.

2. If Nell buys a doll and pays with a five-dollar bill, how much change should she receive?

3. Frank has $4. How much more will he need to buy a sled and a pair of skates?

4. Mary wants a doll and a table set. How much will both cost?

5. Walter has $3.75. How much more will he need to buy an erector?

6. Mrs. Ward bought a pair of skates for each of her two boys. How much did both pairs cost?

7. Nell and her sister bought a toy sewing machine and shared the cost equally. How much did each pay?

8. John and his brother bought an erector. They shared the cost equally. How much did each pay?

9. Donald has $6. If he buys his sister a doll for her birthday, how much money will he have left?

10. How much more does the doll's table set cost than the doll?

11. Walter has $1.95. How much more will he need to buy a sled?

12. Will wants to buy his sister a toy sewing machine for Christmas. He has saved up $2.75. How much more does he need?

13. Mr. Brown bought sleds for each of his three nephews. How much did they all cost?

REVIEWING DIVISION

1. If pencils are 3¢ each,

12¢ will buy 12¢ ÷ 3¢ or ——.
15¢ will buy 15¢ ÷ 3¢ or ——.
24¢ will buy 24¢ ÷ 3¢ or ——.
18¢ will buy 18¢ ÷ 3¢ or ——.

2. If I pay 12¢ for 3 apples, 1 will cost 12¢ ÷ 3, or ——¢.

3. If I pay 21¢ for 3 chocolate bars, 1 will cost 21¢ ÷ 3, or ——¢.

Make up some problems about these:

4. 24¢ ÷ 3	10. 12¢ ÷ 2	16. 12¢ ÷ 6¢
5. 24¢ ÷ 3¢	11. 12¢ ÷ 3¢	17. 15¢ ÷ 5¢
6. 12¢ ÷ 4	12. 18¢ ÷ 6	18. 24¢ ÷ 8¢
7. 12¢ ÷ 4¢	13. 18¢ ÷ 6¢	19. 14¢ ÷ 2
8. 20¢ ÷ 4	14. 28¢ ÷ 4	20. 18¢ ÷ 3
9. 20¢ ÷ 5	15. 28¢ ÷ 4¢	21. 20¢ ÷ 5.

22. At 4¢ each, how many pears can I buy for 36¢?

23. At 3¢ each, how many bananas can I buy for 24¢?

TESTING WHAT YOU HAVE LEARNED

See how quickly you can do all. Then check each to see if you had all correct. Keep a score of the number you had right. Keep a list of the ones you missed.

Try the same list each week and compare your scores.

Add:

1.	2.	3.	4.	5.	6.
381	340	506	710	619	528
460	268	108	286	307	108
576	170	309	193	526	649

Subtract:

7.	8.	9.	10.	11.	12.
361	528	605	701	326	890
104	165	162	157	109	247

Multiply:

13.	14.	15.	16.	17.	18.
$2.45	$3.08	$4.90	$1.78	$2.09	$1.80
3	3	3	4	4	4

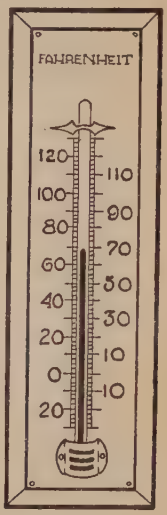
Divide:

19.	20.	21.	22.	23.	24.
3)1422	3)2061	3)1941	4)1732	4)2364	4)3516

25.	26.	27.	28.	29.	30.
3)1068	4)2612	3)1476	4)3696	3)2304	4)3504

MEASURING TEMPERATURE

1. Take a real thermometer and find the top of the column of mercury. Put the thermometer in some warm place. Does the mercury go up or down?



2. Put the thermometer in a cooler place and tell what happens to the mercury.

3. Find how hot it is in the sun today. In the shade.

4. The temperature of your schoolroom should be about 68 degrees. If it is 75 degrees, how much too hot is it?

5. If it is but 56 degrees, how much too cold is it?

6. Water freezes at 32 degrees. If the thermometer registers 28 degrees, would you expect ice to form?

7. Frank noticed that the thermometer hanging on his back porch had registered below 20 degrees for 3 days. Do you think he would find skating on the pond?

8. One morning Frank noticed the thermometer reading was 20. At noon it was 38. How many degrees warmer was it at noon?

9. One cold night the thermometer reading was 8 degrees below zero. This was how many degrees colder than the freezing point?

10. It was 68 degrees in the schoolroom and 20 degrees outside. How much colder was it outside?

11. On the hottest day last August the temperature at Frank's home was 99 degrees. The coldest day in January it was 4 degrees below zero. How many degrees warmer was it in August than in January?

12. One day the mercury fell from 80 degrees at noon to 56 degrees at 8 o'clock in the evening. It was how much cooler in the evening?

13. The Weather Report says, "Frost tonight." It is now 45 degrees. It frosts at 32 degrees. It will have to be how much colder to frost?

14. Water boils at 212 degrees. That is how many degrees above freezing?

15. One day the mercury was 84 degrees at noon. The next day at noon it was 78 degrees. Which was the hotter day? How much hotter?

16. One day the mercury was 48 degrees at Chicago and 52 degrees at New York. At which place was it cooler that day? How much cooler?

17. As I write this page, there is snow on the ground, but the mercury of a thermometer hanging outside of my window registers 40 degrees. Do you think the snow is freezing or thawing? Why?

18. A week ago today the mercury stood at 22 degrees at this time in the afternoon. How much colder than today?

ADDING BY ENDINGS

Before you can add long columns, you must be able to add a two-figured number to a one-figured number.

Study the chart carefully. Notice the endings. $18 + 6$ ends in 4 just as $8 + 6$ does.

Cover the answers and see if you can write them.

A TABLE FOR DAILY STUDY

3	13	4	14	2	12	5	15
7	7	6	6	8	8	5	5
10	20	10	20	10	20	10	20
3	13	4	14	5	15	2	12
8	8	7	7	6	6	9	9
11	21	11	21	11	21	11	21
3	13	5	15	6	16	4	14
9	9	7	7	6	6	8	8
12	22	12	22	12	22	12	22
6	16	4	14	5	15	7	17
7	7	9	9	8	8	7	7
13	23	13	23	13	23	14	24
8	18	5	15	8	18	9	19
6	6	9	9	7	7	6	6
14	24	14	24	15	25	15	25
8	18	9	19	8	18	9	19
8	8	7	7	9	9	9	9
16	26	16	26	17	27	18	28

ADDING BY ENDINGS

1. *Study these and see how they end:*

8	28	48	68	38	88	6	26
9	9	9	9	9	9	8	8
17	37	57	77	47	97	14	34

2. *Add these:*

8	28	48	58	68	78	5	45
7	7	7	7	7	7	9	9

3. John spent 38¢ for a knife and 9¢ for a top. How much did both cost?

4. Helen had 28¢ and earned 7¢ dusting the room. How much had she then?

5. Ralph spent 68¢ for a box of candy for his mother and 9¢ for an ice cream cone for himself. How much did he spend for both?

6. After giving his sister 9 pieces of candy, Frank had 18 pieces left. How much had he at first?

7. Ralph's mother sent him to the store to get a pound of butter costing 48¢ and a box of crackers costing 7¢. How much did both cost?

8. Nell spent 18¢ for a paper doll and 9¢ for extra clothing for it. How much did she spend?

9. Frank bought an air rifle for 78¢ and a box of balls for it for 7¢. How much did all cost?

10. Mrs. Brown paid 88¢ for some groceries and 7¢ to have them delivered. How much did she pay in all?

ADDING BY ENDINGS

Practice daily until you can say all the sums in $1\frac{1}{2}$ minutes or write them in 3 minutes.

19	15	13	18	15	16	18	17	16
3	7	8	5	9	8	2	5	4
18	17	16	17	18	18	19	13	19
4	3	5	6	6	9	5	9	7
19	17	17	15	19	18	16	19	15
2	9	7	6	9	3	4	6	5
14	19	14	16	12	16	18	19	14
9	8	8	6	8	9	8	4	7
13	15	11	17	18	12	17	19	16
7	8	9	4	7	9	8	1	7

1. Make a similar chart, using 2 and 3 instead of 1 in tens' place.

Add:

2.	3.	4.	5.	6.	7.	8.	9.
9	8	7	6	8	7	9	8
7	9	7	9	4	6	6	8
6	4	8	5	9	8	5	7

10.	11.	12.	13.	14.	15.	16.	17.
9	7	7	5	6	7	8	5
9	8	9	8	6	6	4	6
7	6	8	9	8	9	9	8

A NUMBER RACE

The teacher will tell you which set to take. When she says, "Go," write the answers as quickly as possible. The one to finish first says, "Stop." All stop and check their work. The one having the most correct wins.

Add and check:

1.	2.	3.	4.	5.	6.	7.	8.
26	58	64	42	31	45	63	49
43	93	39	36	48	28	42	34
75	14	28	87	29	36	54	27
86	27	51	19	54	27	21	18

9.	10.	11.	12.	13.	14.	15.	16.
22	60	26	43	51	48	90	84
43	28	90	26	40	20	24	24
76	38	19	50	38	36	19	37
19	17	27	79	27	47	36	20

Subtract and check:

1.	2.	3.	4.	5.	6.	7.
346	508	480	601	321	827	528
182	135	127	147	169	369	146

8.	9.	10.	11.	12.	13.	14.
639	936	804	916	830	716	834
347	298	357	269	146	529	348

Make up other exercises like these and have number races until you can add quickly and accurately.

REVIEWING SUBTRACTION

1. On August 1, the speedometer of Mr. Brown's automobile read "3876 miles." On August 31 it read "5100 miles." How far had the car been driven?

5100	*Think, "6 and 4 are 10, 1 to carry."*	*Write 4.*
3876	*Think, "8 and 2 are 10, 1 to carry."*	*Write 2.*
1224	*Think, "9 and 2 are 11, 1 to carry."*	*Write 2.*
	Think, "4 and 1 are 5." *Write 1.*	

Subtract and then check by addition:

2.	**3.**	**4.**	**5.**	**6.**	**7.**
3800	2600	8300	7600	4200	8000
1638	1247	3851	2836	1764	2465

8.	**9.**	**10.**	**11.**	**12.**	**13.**
7000	9000	6000	8000	3004	5001
3457	1236	2472	5394	1632	2481

14. John had $16 in his bank. If he spends $9.35 for a coaster, how much will he have left?

Write $16 as $16.00 before subtracting.

15. Ralph is going with his father on an automobile trip. If the trip is 400 miles and they go 218 miles the first day, how far will they have to go the second day?

16. A man drove 500 miles in two days. He drove 264 miles the first day. How far did he drive the second day?

REVIEWING TERMS USED IN ARITHMETIC

1. *Add:*

245
367
289
901

245, 367, and 289 are called the **addends.**
901 is called the **sum.**
The process is called **addition.**

2. *Subtract:*

5406
1874
3532

5406 is called the **minuend.**
1874 is called the **subtrahend.**
3532 is called the **difference** or **remainder.**
The process is called **subtraction.**

3. *Multiply:*

368
4
1472

368 is called the **multiplicand.**
4 is called the **multiplier.**
1472 is called the **product.**
The process is called **multiplication.**

4. *Divide:*

4)1736
434

1736 is called the **dividend.**
4 is called the **divisor.**
434 is called the **quotient.**
The process is called **division.**

5. How much will 3 boxes of apples cost at $3.75 a box? Tell which is the multiplier, the multiplicand, and the product.

REVIEW OF DIVISION

Give the quotients, and remainders if any:

1.	2.	3.	4.	5.	6.
2)11	2)14	2)17	3)20	2)24	3)29
3)11	3)14	3)17	4)20	3)25	4)29
4)11	4)14	4)17	3)21	4)25	4)30
2)12	2)15	2)18	4)21	3)26	4)31
3)12	3)15	3)18	3)22	4)26	4)32
4)12	4)15	4)18	4)22	3)27	4)33
2)13	2)16	2)19	3)23	4)27	4)34
3)13	3)16	3)19	4)23	3)28	4)35
4)13	4)16	4)19	3)24	4)28	4)36

Find the quotients:

1.	2.	3.	4.	5.	6.
2)374	2)532	2)756	2)398	2)910	2)796
7.	**8.**	**9.**	**10.**	**11.**	**12.**
3)564	3)468	3)717	3)852	3)267	3)432
13.	**14.**	**15.**	**16.**	**17.**	**18.**
4)732	4)524	4)916	4)620	4)956	4)312

MULTIPLYING AND CHECKING BY DIVISION

1. At 38¢ a dozen, how much will 4 dozen oranges cost?

\$0.38	4)\$1.52
4	\$0.38 or 38¢
\$1.52	

\$1.52 is right, for if 4 dozen cost \$1.52, one dozen will cost $\frac{1}{4}$ of \$1.52 or 38¢.

Find the products and check by division:

2.	3.	4.	5.	6.	7.	8.	9.
48	53	65	78	96	83	67	87
3	4	3	4	2	4	3	4
10.	**11.**	**12.**	**13.**	**14.**	**15.**	**16.**	**17.**
92	59	67	29	38	46	57	29
3	4	4	3	4	4	4	4
18.	**19.**	**20.**	**21.**	**22.**	**23.**	**24.**	**25.**
86	95	238	349	167	546	269	378
4	4	3	3	3	3	3	3

26. Find the cost of 4 dozen eggs at 56¢ a dozen.

27. At 85¢ a basket, how much will 3 baskets of potatoes cost?

28. Frank bought 4 baskets of carrots for his rabbits at 95¢ a basket. How much did they cost?

MEASURING HEIGHTS AND LENGTHS

1. These boys are using a yardstick to find their heights. Charles is 1 yard and 11 inches and Walter is 1 yard and 16 inches.

A yardstick is divided into 36 inches.

Charles's Height	Walter's Height
36 inches	36 inches
11 inches	16 inches
47 inches	52 inches

2. With a foot rule, these boys measured the length of their desk. It was 2 feet and 8 inches.

A foot rule is divided into 12 inches.

The desk was 2×12 inches $+ 8$ inches or 32 inches long.

12 inches (in.) = 1 foot (ft.).
36 inches or 3 ft. = 1 yard (yd.).

3. How many inches in 2 yards?

4. A piece of ribbon is 2 yd. and 7 in. long. How many inches is that?

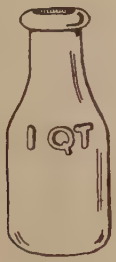
5. The window in John's room is 2 ft. and 9 in. wide. How many inches is that?

6. How many inches in $\frac{1}{2}$ of a yard? In $\frac{1}{3}$ of a yard? In $\frac{1}{4}$ of a yard?

MEASURING MILK

1. In towns and cities the milkman usually leaves milk at the houses in pint or quart bottles. Which is the larger?

2. It takes 2 pint bottles to fill 1 quart bottle. So a quart is twice as large. How many pints will fill 2 quart bottles?



3. Three quart bottles of milk will fill how many pint bottles?

4. *Fill the blanks:*

1 quart = —— pints.	5 quarts = —— pints.
2 quarts = —— pints.	6 quarts = —— pints.
3 quarts = —— pints.	7 quarts = —— pints.
4 quarts = —— pints.	8 quarts = —— pints.

5. People wanting large quantities of milk buy it in larger cans called gallon cans. It takes 4 quarts to fill a gallon can. Two gallon cans will fill how many quart bottles?

6. Name other liquids besides milk that are measured by the pint, quart, or gallon.

Since these measures are used in measuring liquids, they are called "liquid measures."

7. *Learn the table of liquid measure:*

2 pints (pt.) = 1 quart (qt.).
4 quarts = 1 gallon (gal.).

A REVIEW OF MEASURES

Give the missing number:

1.

3 gal. = —— qt.
5 gal. = —— qt.
8 gal. = —— qt.
6 gal. = —— qt.
2 gal. = —— qt.
4 gal. = —— qt.
7 gal. = —— qt.
9 gal. = —— qt.

2.

5 yd. = —— ft.
9 yd. = —— ft.
6 yd. = —— ft.
2 yd. = —— ft.
7 yd. = —— ft.
3 yd. = —— ft.
4 yd. = —— ft.
8 yd. = —— ft.

3.

7 qt. = —— pt.
9 qt. = —— pt.
6 qt. = —— pt.
2 qt. = —— pt.
8 qt. = —— pt.
5 qt. = —— pt.
4 qt. = —— pt.

4.

16 qt. = —— gal
36 qt. = —— gal.
24 qt. = —— gal.
20 qt. = —— gal.
12 qt. = —— gal.
28 qt. = —— gal.
32 qt. = —— gal.

5.		6.	
12 ft.	= —— yd.	10 pt.	= —— qt.
9 ft.	= —— yd.	16 pt.	= —— qt.
15 ft.	= —— yd.	8 pt.	= —— qt.
6 ft.	= —— yd.	12 pt.	= —— qt.
18 ft.	= —— yd.	18 pt.	= —— qt.
27 ft.	= —— yd.	4 pt.	= —— qt.
21 ft.	= —— yd.	14 pt.	= —— qt.
24 ft.	= —— yd.	6 pt.	= —— qt.

7. If milk costs 14¢ a quart, how much is that for a pint?

8. If a yard of ribbon costs 60¢, how much is that for a foot?

9. If a quart of ice cream costs 80¢, how much will a gallon cost at the same rate?

10. If a piece of lace a foot long cost 30¢, how much a yard was it?

11. If a pint can of maple sirup costs 40¢, how much is that a quart?

12. When maple sirup costs 90¢ a quart, how much is that for a pint?

13. When milk sells for 48¢ a gallon, how much is that for a quart?

14. Mrs. Smith paid $2.80 for a gallon of ice cream. How much a quart did it cost her?

WEIGHING GROCERIES AND MEATS

1. Name some groceries that are sold by the pound.

2. Does your mother buy less than a pound of such things as spices? How are they weighed?

Groceries and meat are weighed in pounds and ounces.

16 ounces (oz.) = 1 pound (lb.).

3. How many ounces in $\frac{1}{2}$ of a pound? In $\frac{1}{4}$ of a pound?

$$8 \text{ oz.} = \tfrac{1}{2} \text{ lb.}$$
$$4 \text{ oz.} = \tfrac{1}{4} \text{ lb.}$$

4. How many ounces in $1\frac{1}{2}$ pounds? This means 1 pound and $\frac{1}{2}$ of a pound. It is read "one and a half pounds."

5. When butter is 56¢ a pound, how much will half a pound cost?

6. When cheese is 38¢ a pound, how much will half a pound cost?

7. A steak weighing $1\frac{1}{2}$ pounds cost 48¢ a pound. How much did it all cost?

2)48¢	*1 pound cost 48¢.* $\frac{1}{2}$ *pound cost* $\frac{1}{2}$ *of 48¢*
24¢	*or 24¢. So all will cost the sum of 48¢ and*
72¢	*24¢, or 72¢.*

8. At 56¢ a pound, how much will $1\frac{1}{2}$ lb. of butter cost?

9. At 36¢ a pound, how much will $1\frac{1}{2}$ lb. of coffee cost?

Use these prices and find the cost of the following:

Tea, 80¢ a pound.	**Nuts, 38¢ a pound.**
Coffee, 28¢ a pound.	**Candy, 70¢ a pound.**
Cheese, 42¢ a pound.	**Bacon, 46¢ a pound.**

10. Find the cost of $2\frac{1}{2}$ lb. of bacon.

Find the cost of 2 pounds and of $\frac{1}{2}$ *pound and add.*

11. Find the cost of $2\frac{1}{2}$ lb. of nuts.

12. Find the cost of $1\frac{1}{2}$ lb. of cheese.

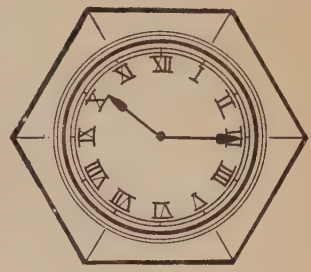
13. How much will $3\frac{1}{2}$ lb. of coffee cost?

14. How much will $2\frac{1}{2}$ lb. of candy cost?

15. Find the cost of $1\frac{1}{2}$ lb. of tea.

ROMAN NUMERALS: TELLING TIME

1. The figures on many clock and watch faces are called Roman Numerals. Look at this picture of a clock face and tell how each number from 1 to 12 is written.



2. On a clock or watch face IIII stands for 4. In numbering the chapter of a book or in other uses, IV stands for 4. See if you can find IV as the number of a chapter in a book.

3. It takes the long hand of a clock 5 minutes to go from one number to another. Starting at I, count 5 as you look at each figure in order, saying, "five, ten, fifteen," and so on, as you look at I, II, III, ...

4. How long does it take the long hand to go from XII to III?

5. What time is it by the clock face in the picture?

6. When the long hand is at III. what time is it when the short hand is at VI? When the short hand is at VIII? When it is at IX?

7. When the long hand is at XII and the short hand at V, what time is it?

8. How long does it take the long hand to go from XII around to XII again?

9. Beginning at I, count entirely around a clock face as in problem 3, and see how many minutes in an hour?

10. Do you know how many hours in a day?

60 minutes make 1 hour.
24 hours make 1 day.

PROBLEMS IN TIME

A.M. means before noon. P.M. means past noon.

1. How many hours from 9 o'clock in the morning to 12 o'clock (noon)?

2. How many hours from 7 o'clock in the morning to 11 o'clock in the morning?

3. How long is it from 15 minutes past 3 o'clock in the afternoon to 15 minutes past 5 in the afternoon?

" 15 minutes past 3 in the afternoon " is written 3 : 15 P.M.

4. What does 2 : 15 P.M. mean?

5. How long is it from 30 minutes past 9 o'clock in the morning until noon?

" 30 minutes past 9 o'clock in the morning " is written 9 : 30 A.M.

6. *Tell what these mean:*

8 : 15 A.M.	8 : 40 A.M.	3 : 05 P.M.
9 : 30 P.M.	10 : 15 A.M.	4 : 45 P.M.
7 : 10 A.M.	2 : 45 P.M.	6 : 30 A.M.

7. If school begins at 9 A.M. and closes at 3 : 30 P.M., how long from the opening until the closing of school?

8. If John starts to school at 8 : 30 and it takes 20 minutes to go, at what time will he get there?

9. How long is it from 8 : 30 A.M. to 1 : 30 P.M.?

REVIEW OF MULTIPLICATION

Give products:

1.	2.	3.	4.
$2 \times 3 =$	$3 \times 2 =$	$3 \times 6 =$	$6 \times 3 =$
$2 \times 4 =$	$4 \times 2 =$	$3 \times 7 =$	$7 \times 3 =$
$2 \times 5 =$	$5 \times 2 =$	$3 \times 8 =$	$8 \times 3 =$
$2 \times 6 =$	$6 \times 2 =$	$3 \times 9 =$	$9 \times 3 =$
$2 \times 7 =$	$7 \times 2 =$	$4 \times 5 =$	$5 \times 4 =$
$2 \times 8 =$	$8 \times 2 =$	$4 \times 6 =$	$6 \times 4 =$
$2 \times 9 =$	$9 \times 2 =$	$4 \times 7 =$	$7 \times 4 =$
$3 \times 4 =$	$4 \times 3 =$	$4 \times 8 =$	$8 \times 4 =$
$3 \times 5 =$	$5 \times 3 =$	$4 \times 9 =$	$9 \times 4 =$

Give the missing number:

1.	2.	3.	4.
$\_ \times 5 = 15$	$3 \times \_ = 18$	$\_ \times 9 = 36$	$7 \times \_ = 28$
$\_ \times 9 = 18$	$4 \times \_ = 12$	$\_ \times 3 = 24$	$6 \times \_ = 18$
$\_ \times 2 = 14$	$7 \times \_ = 21$	$\_ \times 6 = 18$	$9 \times \_ = 18$
$\_ \times 6 = 12$	$6 \times \_ = 24$	$\_ \times 8 = 32$	$5 \times \_ = 20$
$\_ \times 5 = 20$	$4 \times \_ = 20$	$\_ \times 3 = 21$	$4 \times \_ = 28$

Find the products:

1.	2.	3.	4.	5.	6.
340	502	670	908	780	309
3	3	3	3	3	3

7.	8.	9.	10.	11.	12.
903	870	890	706	509	470
4	4	4	4	4	4

A SCHOOL PICNIC

1. The second and third grade classes had a picnic in the woods one Saturday. There were 35 pupils from the second grade and 37 from the third grade. With their 2 teachers, how many in the party?

2. There were 38 boys in the party. How many girls were there in the party?

3. One teacher collected the total amount of carfare which was $14.80. The other collected the money for the refreshments which was $18.50. What was the whole expense of the trip?

4. How much more did the refreshments cost than the carfare?

5. The children found hickory nuts and walnuts on the trip. They picked up 28 quarts of hickory nuts and 17 quarts of walnuts. How many quarts of both?

MAKING THE "5 TIMES" TABLE

1. *Facts you know:*

$2 \times 5 = ?$	$3 \times 5 = ?$	$4 \times 5 = ?$
$5 \times 2 = ?$	$5 \times 3 = ?$	$5 \times 4 = ?$

2. *Facts to find:*

5	6	7	8	9
5	6	7	8	9
5	6	7	8	9
5	6	7	8	9
5	6	7	8	9

3. *Facts to write:*

$5 \times 5 =$	$5 \times 7 =$	$5 \times 9 =$
$5 \times 6 =$	$5 \times 8 =$	$9 \times 5 =$

4. *Say these, then cover the answers and see if you can write them:*

$5 \times 1 = 5$	$5 \times 4 = 20$	$5 \times 7 = 35$
$5 \times 2 = 10$	$5 \times 5 = 25$	$5 \times 8 = 40$
$5 \times 3 = 15$	$5 \times 6 = 30$	$5 \times 9 = 45$

5. At 5¢ each, how much will 6 oranges cost?

6. At 5¢ each, how many oranges can you buy for 40¢? For 25¢? For 35¢? For 45¢?

7. *Give the missing number:*

$? \times 1 = 5$	$5 \times ? = 40$	$5 \times ? = 25$
$5 \times ? = 15$	$? \times 5 = 20$	$? \times 5 = 30$
$? \times 5 = 35$	$? \times 5 = 10$	$5 \times ? = 45$

8. *Give the missing number:*

$5 \times 1 = ?$	$5 \times 2 = ?$	$5 \times 6 = ?$
$1 \times 5 = ?$	$2 \times 5 = ?$	$6 \times 5 = ?$
$5 \times 3 = ?$	$5 \times 4 = ?$	$5 \times 9 = ?$
$3 \times 5 = ?$	$4 \times 5 = ?$	$9 \times 5 = ?$
$5 \times 7 = ?$	$5 \times 8 = ?$	
$7 \times 5 = ?$	$8 \times 5 = ?$	$5 \times 5 = ?$

DRILL IN THE "5 TIMES" TABLE

1. If it costs 5¢ a ride on the street car,

6 rides will cost $6 \times 5¢$, or ——¢
7 rides or ——¢
9 rides or ——¢
8 rides or ——¢

2. There are —— 5's in 20. There are —— 5's in 25.
There are —— 5's in 40. There are —— 5's in 35.
There are —— 5's in 30. There are —— 5's in 45.

3. At 5¢ each I can buy —— oranges for 15¢.
At 5¢ each I can buy —— oranges for 30¢.
At 5¢ each I can buy —— oranges for 20¢.

4. At 5¢ each, tell how many oranges you can buy for

10¢ 25¢ 35¢ 40¢ 45¢

Multiply:

5.	6.	7.	8.	9.	10.	11.
325	463	728	936	981	708	690
5	5	5	5	5	5	5

DIVIDING BY 5

1. *Divide each by 5:*

15 20 30 40 25 35 10 45

2. *Divide by 5 and tell how many remain:*

12 16 22 31 42 27 37 46

3. To trim a Christmas tree, a third-grade class collected $1.35 to buy tinsel at 5¢ a yard. How many yards can they buy?

$$5\overline{)135}\quad 27$$

Think, "$1.35 is 135¢."
Before dividing dollars and cents by cents, change all to cents.

4. For a picnic, a class has $2.45 to buy sandwiches at 5¢ each. How many can they buy?

5. At 5¢ each, how many trolley rides can you buy for $2?

$5\overline{)200}$ *Think "$2 is 200¢." Divide 200 by 5.*

6. A boy took in $3.40 one afternoon from the sale of lemonade at 5¢ a glass. He must have sold how many glasses?

Divide:

7.	8.	9.	10.	11.	12.
$5\overline{)1640}$	$5\overline{)2345}$	$5\overline{)1390}$	$5\overline{)2685}$	$5\overline{)4210}$	$5\overline{)3675}$

EXERCISES IN PRIMARY DIVISION FACTS

Before you can divide larger numbers by 5 rapidly, you must be able to say the quotients and remainders of these.

5)6	5)7	5)8	5)12	5)28	5)42
5)20	5)45	5)35	5)25	5)41	5)31
5)33	5)37	5)22	5)39	5)30	5)44
5)47	5)34	5)23	5)14	5)43	5)17
5)38	5)48	5)36	5)27	5)16	5)46
5)11	5)21	5)9	5)40	5)29	5)19
5)24	5)49	5)26	5)13	5)18	5)32

PROBLEMS

1. Frank sold 28 copies of *The Saturday Evening Post* at 5¢ a copy. How much did he get for all?

2. Ned had a lemonade stand on his front lawn one day last August. He took in $2.35. At 5¢ a glass, he must have sold how many glasses?

3. Mary gets 5¢ each evening for drying the dishes. She will have to dry them how many times to earn enough to buy a doll costing $1.95?

4. John is earning money to buy a bicycle. He needs $2.85 more. To earn it in 5 weeks, he must earn an average of how much each week?

5. In a third-grade class there were 34 pupils. Each brought 5¢ to help buy and trim a Christmas tree. How much money did all bring?

6. Mary wants to save up $1.75 to buy a doll. If she puts 5¢ in her bank every day, how many days will it take to save $1.75?

7. John is saving money to buy some skates. They will cost him $1.95. He saves 5¢ each time he walks to school instead of riding on the street car. He will have to walk how many times to save enough to buy the skates?

8. Nell is earning money to buy a book costing $1.30. She gets 5¢ each morning for dusting the room. She will have to dust the room how many times to earn enough to buy the book?

9. Five boys bought a large coaster costing $9.50 and shared the cost equally. How much did it cost each?

10. It will take how many nickels to make $1.85?

11. John earned $2.75 each week for 5 weeks. Find how much he earned.

12. Some children had a show and charged 5¢ admission. They took in 90¢. How many were there?

MAKING THE "6 TIMES" TABLE

1. *Facts you know:*

$6 \times 2 = ?$ $\quad$ $6 \times 4 = ?$
$6 \times 3 = ?$ $\quad$ $6 \times 5 = ?$

2. There are four new facts to learn in the "6 times" table. See if you can find them.

$6 \times 6 = ?$ $\quad$ $6 \times 8 = ?$
$6 \times 7 = ?$ $\quad$ $6 \times 9 = ?$

Add:

6	7	8	9
6	7	8	9
6	7	8	9
6	7	8	9
6	7	8	9
6	7	8	9

3. Show two ways of finding the cost of 6 yards of cloth at 78¢ a yard. Tell which way you like best, and why you like it best.

4. Tell why it pays to know how to multiply.

5. At 5¢ each, how much will 6 oranges cost?

6. *Read and remember:*

$6 \times 1 = 6$	$6 \times 4 = 24$	$6 \times 7 = 42$
$6 \times 2 = 12$	$6 \times 5 = 30$	$6 \times 8 = 48$
$6 \times 3 = 18$	$6 \times 6 = 36$	$6 \times 9 = 54$

7. *From the "6 times" table give:*

$1 \times 6 =$	$4 \times 6 =$	$7 \times 6 =$
$2 \times 6 =$	$5 \times 6 =$	$8 \times 6 =$
$3 \times 6 =$	$6 \times 6 =$	$9 \times 6 =$

8. *Tell what 6 of each of the following will cost:*

Grape fruit	9¢	Large oranges	8¢
Large apples	7¢	Pears	6¢
Bananas	4¢	Small apples	3¢

9. *Give the missing number:*

$6 \times 3 + 4 = —$ $\quad$ $6 \times 2 + 4 = —$
$6 \times 5 + 3 = —$ $\quad$ $6 \times 4 + 5 = —$
$6 \times 8 + 5 = —$ $\quad$ $6 \times 6 + 2 = —$
$6 \times 9 + 3 = —$
$6 \times 7 + 2 = —$
$6 \times 1 + 5 = —$

PROBLEMS

1. Frank bought 6 hens at $2.15 each. How much did they cost him?

2. One month he sold 6 dozen eggs at 78¢ a dozen. How much did he get for them?

3. Helen bought 6 pounds of candy for her party at 54¢ a pound. How much did it cost?

4. How much can Walter earn in 6 weeks at $2.15 a week?

5. Ralph earned $2.35 one week and $1.95 the next. How much did he earn in the two weeks?

6. Helen bought 6 yards of goods for a dress and aprons. At 79¢ a yard, how much did it cost?

7. Walter has saved up $7.50. If he spends $2.95 of it for a pair of skates, how much will he have left?

AT THE FRUIT STAND

Oranges, per doz. 60¢	Grapes, per lb. 20¢
Lemons, per doz. 30¢	Bananas, per doz. 40¢
Grape fruit, each 15¢	Plums, per lb. 30¢
Apples, per doz. 50¢	Pineapples, each 18¢

12 things make a dozen (doz.). 6 things make $\frac{1}{2}$ doz.

Find the cost of the following orders:

1.
1 doz. oranges
$\frac{1}{2}$ doz. lemons
1 doz. apples

2.
$1\frac{1}{2}$ doz. oranges
1 pineapple
2 lb. grapes
$\frac{1}{2}$ doz. bananas

3.
$\frac{1}{2}$ doz. lemons
3 grape fruit
$1\frac{1}{2}$ doz. apples
$2\frac{1}{2}$ lb. plums

4.
2 pineapples
$\frac{1}{2}$ doz. bananas
$1\frac{1}{2}$ lb. plums
$\frac{1}{2}$ doz. apples

5.
$1\frac{1}{2}$ doz. bananas
$\frac{1}{2}$ doz. oranges
1 pineapple

6.
4 grape fruit
2 pineapples
6 lemons
6 oranges

7.
6 apples
2 doz. bananas
$1\frac{1}{2}$ doz. lemons
$2\frac{1}{2}$ doz. oranges

8.
$2\frac{1}{2}$ lb. plums
$1\frac{1}{2}$ lb. grapes
$1\frac{1}{2}$ doz. bananas
$1\frac{1}{2}$ doz. apples

REVIEW OF MULTIPLICATION

1. *Give the missing number:*

$6 \times 2 =$	$6 \times 6 =$	$6 \times \_ = 48$	$6 \times \_ = 36$
$6 \times 3 =$	$6 \times 7 =$	$6 \times \_ = 30$	$6 \times \_ = 54$
$6 \times 4 =$	$6 \times 8 =$	$6 \times \_ = 24$	$6 \times \_ = 42$
$6 \times 5 =$	$6 \times 9 =$	$6 \times \_ = 12$	$6 \times \_ = 18$

2. When a trolley ride costs 6¢, how much will it cost for 8 rides? For 6 rides? 7 rides? 9 rides?

3. At 6¢ each, how many oranges can you buy for: 42¢? 30¢? 54¢? 48¢? 18¢? 24¢? 36¢?

Find the products:

4.	**5.**	**6.**	**7.**	**8.**	**9.**
25	34	87	96	39	48
6	6	6	6	6	6

10.	**11.**	**12.**	**13.**	**14.**	**15.**
504	708	309	607	902	809
6	6	6	6	6	6

16. *Give the missing number:*

$4 \times 2 =$	$5 \times 2 =$	$4 \times \_ = 20$	$5 \times \_ = 35$
$4 \times 3 =$	$5 \times 3 =$	$4 \times \_ = 32$	$5 \times \_ = 20$
$4 \times 4 =$	$5 \times 4 =$	$4 \times \_ = 36$	$5 \times \_ = 15$
$4 \times 5 =$	$5 \times 5 =$	$4 \times \_ = 16$	$5 \times \_ = 30$
$4 \times 6 =$	$5 \times 6 =$	$4 \times \_ = 8$	$5 \times \_ = 10$
$4 \times 7 =$	$5 \times 7 =$	$4 \times \_ = 24$	$5 \times \_ = 40$
$4 \times 8 =$	$5 \times 8 =$	$4 \times \_ = 12$	$5 \times \_ = 25$
$4 \times 9 =$	$5 \times 9 =$	$4 \times \_ = 28$	$5 \times \_ = 45$

DIVIDING BY 6

1. *Give the missing factor:*

$? \times 6 = 24$	$6 \times ? = 18$	$6 \times ? = 36$
$6 \times ? = 12$	$? \times 6 = 54$	$? \times 6 = 48$
$? \times 6 = 6$	$6 \times ? = 42$	$? \times 6 = 30$

2. *Read these, then cover the quotients and write them:*

$6\overline{)12}\ 2$ $6\overline{)24}\ 4$ $6\overline{)36}\ 6$ $6\overline{)48}\ 8$ $6\overline{)30}\ 5$ $6\overline{)42}\ 7$ $6\overline{)54}\ 9$

3. At 6¢ each, how many pears can you buy for 30¢?

$6¢\overline{)30¢}\ 5$ *Think, "30¢ ÷ 6¢ = 5."*

4. If 6 oranges cost 24¢, how much is that for each?

$6\overline{)24¢}\ 4¢$ *Think, "24¢ ÷ 6 = 4¢."*

5. To trim a Christmas tree, some children want some red tissue paper bells costing 6¢ each. They have 36¢ to spend. How many can they buy?

6. If the children (problem 5) had $1.08 to spend, how many bells at 6¢ each could they buy?

7. At 6¢ each, how many apples can be bought for $1.38?

8. At 6¢ each, how many almond bars can be bought for $2.34?

DRILL TABLE IN DIVISION

Before you can divide by 6 quickly you must be able to give the quotient and remainder to these.

1.	2.	3.	4.	5.	6.
6)6	6)21	6)9	6)10	6)11	6)18
6)19	6)51	6)38	6)29	6)42	6)43
6)26	6)8	6)22	6)39	6)30	6)31
6)56	6)45	6)52	6)23	6)40	6)41
6)13	6)33	6)46	6)53	6)24	6)25
6)32	6)14	6)34	6)47	6)54	6)55
6)44	6)57	6)15	6)35	6)48	6)12
6)7	6)27	6)58	6)16	6)36	6)49
6)50	6)20	6)28	6)59	6)17	6)37

WRITTEN EXERCISES IN DIVISION

Divide:

1. 6)1368	5. 6)3564	9. 6)3456	13. 6)3492
2. 6)2352	6. 6)4626	10. 6)2538	14. 6)2376
3. 6)2754	7. 6)5334	11. 6)3174	15. 6)4362
4. 6)1782	8. 6)4752	12. 6)2718	16. 6)5616

AT THE MEAT MARKET

Roast of beef, per lb.	42¢	Chops, per lb.	54¢
Roast of lamb, per lb.	48¢	Fowl, per lb.	38¢
Roast of pork, per lb.	36¢	Broilers, per lb.	52¢
Steak, per lb.	46¢	Fish, per lb.	32¢

1. How much will $\frac{1}{2}$ lb. of steak cost?
2. Find the cost of $1\frac{1}{2}$ lb. of steak.

$$\begin{array}{r} 46¢ \\ 23¢ \\ \hline 69¢ \end{array}$$

Think, "1 lb. will cost 46¢." Then think, "$\frac{1}{2}$ lb. will cost $\frac{1}{2}$ of 46¢, or 23¢." Then add.

3. How much will $1\frac{1}{2}$ lb. of chops cost?
4. A broiler weighing $1\frac{1}{2}$ lb. will cost how much?
5. Find the cost of a fowl weighing $5\frac{1}{2}$ lb.

$$\begin{array}{r} 38¢ \\ 5\frac{1}{2} \\ \hline 19¢ \\ 190 \\ \hline \$2.09 \end{array}$$

Think, "$\frac{1}{2}$ lb. will cost 19¢." Then think, "5 lb. will cost 5 × 38¢." Then add.

6. Find the cost of a $6\frac{1}{2}$ lb. roast of beef.

Find the cost of:

7. A $3\frac{1}{2}$ lb. roast of lamb.
8. A $4\frac{1}{2}$ lb. roast of pork.
9. A $3\frac{1}{2}$ lb. fish.
10. A $2\frac{1}{2}$ lb. broiler.
11. $3\frac{1}{2}$ lb. of steak.
12. $2\frac{1}{2}$ lb. of chops.
13. A $4\frac{1}{2}$ lb. fowl.
14. A $2\frac{1}{2}$ lb. fish.

REVIEWING MULTIPLICATION AND DIVISION

Add:

1.	2.	3.	4.	5.
295	376	481	234	978
295	376	481	234	978
295	376	481	234	978
295	376	481	234	978
295	376	481	234	978
295	376	481	234	978

6. Find the answer to the first five exercises in a shorter way. What is the name of the shorter process?

Find the products and check by division:

7.	8.	9.	10.	11.
293	485	637	429	578
6	6	6	6	6

Find the quotients and check by multiplication:

12.	13.	14.	15.	16.
6)228	6)174	6)276	6)402	6)354

17.	18.	19.	20.	21.
6)2538	6)3456	6)3774	6)3228	6)4446

22. Find 6×216 and check by addition.

23. Find 6×347 and check by addition.

24. Find 6×380 and check by division.

"CLERK WANTED": A GAME

In a certain school the children played that they were applying for the position of clerk in a store. The teacher wrote upon the blackboard:

"CLERK WANTED: must be rapid and accurate in arithmetic."

Then she placed upon the blackboard the prices of articles in local stores, such as,

Potatoes, per basket	85¢	Butter, per lb.	54¢
Apples, per basket	78¢	Oranges, per doz.	36¢
Eggs, per doz.	69¢	Peaches, per can	19¢

All the class were trying to see who would be chosen. The teacher would say, "Send me 5 (or any number not larger than 6) baskets of potatoes." The first pupil to get the correct cost would stand. The pupil who got the answer first for five times was then selected as clerk. The pupils then took turns in giving an order. All pupils found the cost. If the clerk gave the wrong cost, the first to give the right cost was clerk. Each day the pupils brought in new prices of things they saw in the market and continued playing the game for several days. If you would like to play the game, ask your teacher to let you play it. In playing it, get prices that will give *all* the figures, or at least the larger numbers. Then ask for as large a number of articles as you can find the cost of. In that way, the game will help you in multiplication.

NUMBER RACES IN ADDITION

See who can win a number race. Be ready to start when the teacher says, "Go." The first to finish says, "Stop." Then each pupil tells how far he got.

In this way you can measure your speed in arithmetic, as you measure it in running or jumping.

Race I

1.	2.	3.	4.	5.	6.	7.	8.
34	73	85	35	72	86	37	54
26	68	96	26	46	21	96	67
84	24	38	98	38	48	84	81
91	37	42	54	57	39	32	19

Race II

1.	2.	3.	4.	5.	6.
306	570	784	96	570	375
574	84	438	380	289	268
97	396	290	197	47	937
438	237	79	468	408	84
260	98	108	73	392	209

7.	8.	9.	10.	11.	12.
204	642	42	570	642	527
598	109	860	93	190	196
279	380	193	807	378	400
38	16	204	65	46	87
103	98	87	390	38	96

SUBTRACTION RACES

Race I

1.	2.	3.	4.	5.	6.	7.	8.
42	96	57	48	63	85	74	63
19	38	29	19	28	39	28	37

9.	10.	11.	12.	13.	14.	15.	16.
81	70	56	45	76	81	73	96
37	24	19	28	39	43	26	47

Race II

1.	2.	3.	4.	5.	6.
538	640	827	964	838	726
145	326	542	628	546	518

7.	8.	9.	10.	11.	12.
630	849	746	684	729	863
126	564	253	193	576	629

Race III

1.	2.	3.	4.	5.	6.
635	509	731	863	931	804
187	286	486	297	487	389

7.	8.	9.	10.	11.	12.
734	640	913	837	793	846
289	198	748	299	189	597

MULTIPLICATION RACES

Race I

1.	2.	3.	4.	5.	6.	7.	8.
64	28	39	47	65	84	39	26
4	3	5	2	4	5	3	4

9.	10.	11.	12.	13.	14.	15.	16.
57	68	39	47	64	86	93	84
5	4	4	5	6	5	5	6

Race II

1.	2.	3.	4.	5.	6.
426	539	284	349	186	394
5	4	3	5	6	4

7.	8.	9.	10.	11.	12.
537	628	729	816	924	395
6	4	5	6	5	4

Race III

1.	2.	3.	4.	5.	6.
297	368	937	826	386	719
4	5	3	6	4	5

7.	8.	9.	10.	11.	12.
398	294	937	846	541	549
6	5	6	3	4	6

DIVISION RACES

Race I

1.	2.	3.	4.	5.	6.
4)156	5)715	6)384	3)267	4)572	5)395
7.	**8.**	**9.**	**10.**	**11.**	**12.**
6)276	4)736	3)225	6)582	5)810	4)372

Race II

1.	2.	3.	4.	5.	6.
6)2436	5)1540	6)1218	4)1628	5)3025	6)1854
7.	**8.**	**9.**	**10.**	**11.**	**12.**
6)465	5)384	4)573	5)964	6)765	4)731

PROBLEMS

1. Which will cost more, 3 hens at \$2.85 each or 4 hens at \$2.10 each? How much more?

2. One school has 5 rooms of 38 pupils each, and another has 6 rooms of 32 pupils each. Which school is larger and how much?

3. John earned \$1.85 a week for 4 weeks and Frank earned \$1.15 a week for 6 weeks. Who earned more? How much more?

4. A class has \$1.95 to spend for decorations for a Christmas tree. They can get assorted decorations at 3¢ each, or larger ones at 5¢ each. How many more can they get by taking the cheaper kind?

5. Five boys bought a boat costing $32.75 and divided the cost equally. How much did it cost each?

6. Six girls bought a coaster costing $14.10 and divided the cost equally. How much did it cost each?

7. Nell and her brother picked up 5 baskets of apples and sold them for 90¢ a basket. They divided the money equally. How much did each get?

8. It is 6 weeks until Christmas. John hopes to earn $8.40 to buy a coaster. He will have to average how much a week to do it?

9. Frank was on the trolley one day and saw that the conductor had rung up 48 fares on the trip. At 6¢ a fare, how much money did the conductor collect?

10. On "tag day" for the Fresh Air Home for Children, Nell sold 87 tags at 5¢ each, and Helen sold 109. How much more money did Helen get?

11. Ralph earned $17.10 in 6 weeks. How much did he average per week?

12. Harry paid $3.50 for a box of large apples. There were 96 apples in the box and he sold them for 5¢ each. How much did he make?

13. Walter's father drove 144 miles in 6 hours. How many miles per hour did he average?

14. Walter earned $5 and spent $3.85 of it. How much had he left?

MAKING THE "7 TIMES" TABLE

1. How many days in a week? In 2 weeks? In 3 weeks? In 4 weeks? In 5 weeks? In 6 weeks?

2. How many of the facts in the "7 times" table do you already know from the other tables? Write them down and see.

3. Find 7×7, 7×8, and 7×9.

4. *Read and remember:*

$7 \times 7 = 49$ $7 \times 8 = 56$ $7 \times 9 = 63$

5. If you save 7¢ a day, how much can you save in 7 days?

6. If you spend 8¢ a day for carfare, how much will you spend in a week (7 days)?

7. Helen gets 9¢ a day for helping her mother wash dishes. How much can she earn in a week?

8. Mrs. Brown needs 6 eggs each morning for the family breakfast. How many will she need for a week?

9. *Give the missing number:*

$7 \times 3 + 5 = —$ $7 \times 4 + 3 = —$
$7 \times 6 + 4 = —$ $7 \times 8 + 7 = —$
$7 \times 2 + 6 = —$ $7 \times 5 + 6 = —$
$7 \times 2 + 4 = —$
$7 \times 9 + 6 = —$
$7 \times 7 + 5 = —$

10. Mrs. Smith bought 7 yards of gingham to make dresses for her two little girls. At 65¢ a yard, how much did it cost?

USING THE "7 TIMES" TABLE

1. How many days in 2 weeks and 3 days?

2×7 days + 3 days = —— days.

Tell how many days in:

2. 3 weeks and 1 day.
3. 6 weeks and 3 days.
4. 8 weeks and 2 days.
5. 5 weeks and 4 days.
6. 4 weeks and 5 days.
7. 7 weeks and 1 day.
8. In 14 days, how many weeks?
9. In 21 days, how many weeks?
10. Ten days are how much more than 1 week?
11. Sixteen days are how much more than 2 weeks?

Tell how many weeks and days:

12. 18 da. = — wk. and — da.
13. 24 da. = — wk. and — da.
14. 30 da. = — wk. and — da.
15. 38 da. = — wk. and — da.
16. 40 da. = — wk. and — da.
17. *Tell how many weeks and days in these months:* December, 31 days. February, 28 days. June, 30 days.
18. *Give the missing number:*

$3 \times 7 + 2 = —$	$9 \times 7 + 3 = —$
$5 \times 7 + 6 = —$	$2 \times 7 + 1 = —$
$7 \times 4 + 5 = —$	$7 \times 6 + 5 = —$
$7 \times 8 + 3 = —$	$7 \times 7 + 6 = —$
$\frac{1}{7}$ of 14 = —	$\frac{1}{7}$ of 21 = —
$\frac{1}{7}$ of 28 = —	$\frac{1}{7}$ of 42 = —

EXERCISES IN DIVISION

Before you can do written division by 7 rapidly and accurately you must be able to give the following:

1.	2.	3.	4.	5.	6.	7.
7)7	7)11	7)9	7)8	7)12	7)10	7)13
7)42	7)29	7)60	7)35	7)62	7)32	7)56
7)51	7)57	7)24	7)48	7)19	7)46	7)36
7)25	7)17	7)58	7)14	7)59	7)68	7)65
7)61	7)33	7)38	7)63	7)34	7)15	7)41
7)55	7)50	7)16	7)43	7)27	7)64	7)45
7)18	7)69	7)30	7)22	7)40	7)53	7)20
7)47	7)23	7)67	7)31	7)49	7)21	7)54
7)26	7)39	7)52	7)66	7)37	7)44	7)28

PROBLEMS

1. Walter sold 7 dozen eggs one week at 75¢ a dozen. How much did he get for them?

2. Mrs. Ward's milk bill is 48¢ a day. How much is that for a week?

3. Mrs. Brown bought a leg of lamb that weighed 7 pounds. She paid 36¢ a pound for it. How much did it cost her?

4. Ralph bought 7 little rabbits. They cost him 95¢ each. How much did all cost?

5. Nell sold 7 dozen tulips from her garden. She got 80¢ a dozen for them. How much did she get for all?

6. One week Frank sold 6 dozen eggs at 78¢ a dozen, and the next week he sold 7 dozen at 65¢ a dozen. Did he get more for the 6 dozen, or for the 7 dozen? How much more?

7. Will earns 85¢ a week delivering papers. How much can he earn in 7 weeks?

8. Seven boys bought a canoe costing $32.55 and shared the expense equally. How much did it cost each?

9. One week the seven boys rented their canoe for $5.25. How much of the rent should each boy get?

USING THE "7 TIMES" TABLE

1. Nell got 7¢ each day for drying the dinner dishes. How much did she earn in December (31 days)?

2. Frank took care of the furnace for his father. He got 15¢ each day. How much a week did he earn?

3. Mary was paid $1.20 each week for helping dust the rooms. About how much a day did this average?

4. Walter earned $4.55 a week delivering papers and running errands. This was an average of how much a day for each day in the week?

5. Helen picked and sold strawberries. Her mother let her have 7¢ for each quart she sold. She sold 84 quarts. How much did she earn?

6. Ralph had a paper route and delivered 58 papers each day in the week. If his profit was 1 cent on each, how much did he earn a week?

7. Donald's mother paid him 7¢ a quart to pick her raspberries. One season he picked 69 quarts. How much did he earn?

8. Walter had a flock of 7 hens which he sold to Henry for $13.65. That was an average of how much each?

DRILL EXERCISES

Add and check:

1.	2.	3.	4.	5.	6.
391	738	286	329	547	342
468	269	934	469	361	767
347	847	177	834	428	185
528	154	365	196	176	244
642	360	284	287	289	368

Subtract and check:

7.	8.	9.	10.	11.	12.
930	847	904	523	606	741
176	268	768	187	198	189

13.	14.	15.	16.	17.	18.
611	842	754	841	926	608
289	578	293	337	719	194

THE "8 TIMES" TABLE

1. Find how many of the "8 times" table you know from other tables.

$2 \times 8 =$	$8 \times 2 =$	$5 \times 8 =$	$8 \times 5 =$
$3 \times 8 =$	$8 \times 3 =$	$6 \times 8 =$	$8 \times 6 =$
$4 \times 8 =$	$8 \times 4 =$	$7 \times 8 =$	$8 \times 7 =$

2. You know all of the "8 times" table except 8×8 and 8×9. So learn

$$8 \times 8 = 64 \qquad 8 \times 9 = 72$$

3. *Give the missing number:*

$? \times 8 = 32$	$? \times 8 = 64$	$? \times 8 = 24$	$? \times 8 = 72$
$? \times 8 = 56$	$? \times 8 = 16$	$? \times 8 = 40$	$? \times 8 = 48$

4. *Give the missing number:*

$8 \times ? = 16$	$8 \times ? = 24$	$8 \times ? = 32$	$8 \times ? = 72$
$8 \times ? = 48$	$8 \times ? = 40$	$8 \times ? = 64$	$8 \times ? = 56$

5. *Multiply each by 8 and add 4:*

3 9 6 8 7 4 2 5

6. Multiply each by 8 and add any number that the teacher gives you.

7. At 5¢ each, how much will 8 oranges cost?

8. How many days in 8 weeks?

9. In Nell's classroom there are 6 rows of desks and 8 desks in a row. How many desks in the classroom?

10. The 9 boys in our baseball team bought outfits costing $8 each. How much did it cost for all?

DIVIDING BY 8

To do written division by 8 accurately and quickly you must be able to give the following quotients and remainders quickly.

Give the quotients and remainders if any:

1.	2.	3.	4.	5.	6.	7.
8)16	8)30	8)52	8)28	8)18	8)33	8)36
8)64	8)66	8)46	8)79	8)77	8)67	8)73
8)56	8)23	8)11	8)59	8)45	8)43	8)55
8)72	8)35	8)21	8)60	8)22	8)25	8)31
8)40	8)78	8)38	8)44	8)51	8)41	8)34
8)32	8)42	8)29	8)54	8)65	8)47	8)20
8)48	8)63	8)17	8)69	8)50	8)71	8)53
8)24	8)49	8)70	8)19	8)68	8)76	8)26
8)80	8)58	8)27	8)37	8)74	8)57	8)61

EXERCISES IN WRITTEN DIVISION

Divide and check by multiplication:

1. 8)2376	4. 8)6512	7. 8)5112	10. 8)5536
2. 8)3088	5. 8)3960	8. 8)6776	11. 8)3824
3. 8)3648	6. 8)5968	9. 8)4696	12. 8)5232

EXERCISES AND PROBLEMS

Find the quotients and check by multiplication:

1.	2.	3.	4.	5.	6.
8)304	8)448	8)576	8)592	8)756	8)680
7.	**8.**	**9.**	**10.**	**11.**	**12.**
8)1968	8)2856	8)6608	8)7496	8)6832	8)6104

13. On an automobile trip, Jack and his father rode 184 miles in 8 hours. What was the average number of miles per hour?

14. A camping trip cost Will's brother $128. He was gone 8 weeks. What was the average cost per week?

15. Ralph earned $3.60 picking cherries at 8¢ a quart. He must have picked how many quarts?

16. Billie sold 256 papers in 8 days. That was an average of how many a day?

17. Mary earns 8¢ each day drying dishes. How long will it take her to earn enough to buy a doll that costs $2.40?

18. Eight boys bought a tent costing $15.60. If they share equally, how much must each boy pay?

19. Eight boys went on a camping trip. It cost them $8.75 each. How much did it cost all?

20. Mr. Brown found that his car will run 19 miles on one gallon of gasoline. How far will it run on 8 gallons?

USING THE "8 TIMES" TABLE

1. For 8 weeks during his vacation John earned $2.35 per week. How much did he earn in all?

2. Frank was offered $1.85 each for his 8 hens. How much is that for all?

3. Eight boys went on a hike. The total expense of the trip was $4.48. If they share equally, how much is each boy's share?

4. Walter earned $11.68 in 8 weeks. That was an average of how much each week?

5. Eight girls planned a surprise party for Mary on her birthday. If each girl gives 15¢ toward buying a present, how much money will they have for it?

6. John was offered $14 for his 8 rabbits. That was an average of how much for each? (Write $14 as $14.00 before dividing.)

7. Ralph and his sister had a tree of nice apples from which they sold 8 baskets for 85¢ a basket. How much did they get for all?

8. Donald went riding with his father. They stopped at a garage and got 8 gallons of gasoline at 19¢ a gallon. How much did it cost?

9. Some girls bought 8 dozen eggs to color for an Easter party. At 46¢ a dozen how much did they cost?

10. Helen's mother bought 8 quarts of ice cream for her party. It cost 85¢ a quart. Find how much it all cost.

THE "9 TIMES" TABLE

1. *Give the products:*

$2 \times 9 =$ $5 \times 9 =$ $7 \times 9 =$
$3 \times 9 =$ $6 \times 9 =$ $8 \times 9 =$
$4 \times 9 =$

2. *From these write all of the "9 times" table that you know:*

$9 \times 2 =$ $9 \times 5 =$ $9 \times 7 =$
$9 \times 3 =$ $9 \times 6 =$ $9 \times 8 =$
$9 \times 4 =$

3. Since $8 \times 9 = 72$, $9 \times 9 = 72 + 9 = 81$.

4. Look at the number of tens in each product of the "9 times" table and compare it with the number multiplied by 9. It is how much less?

5. Now look at the two figures in each product. They stand for two numbers whose sum is what?

You see that the tens' number is one less than the number you multiply; and that the sum of the number of tens and ones is 9.

This is an interesting fact about the "9 times" table that will help you to remember the table. But you must practice until you can remember it without this help.

6. *Multiply each by 9 and add 4:*

3 9 6 8 7 4 2 5

7. Multiply each of the numbers in exercise 6 by 9 and add 7. Multiply by 9 and add any number from 1 to 8.

8. *Give the missing numbers:*

$? \times 9 = 27$	$? \times 9 = 54$
$9 \times ? = 63$	$9 \times ? = 81$
$? \times 9 = 45$	$? \times 9 = 18$
$9 \times ? = 36$	$9 \times ? = 72$

DRILL IN DIVIDING BY 9

1. *Divide each by 9:*

18 45 72 9 54 27 63 81 36

Give the answers:

2.	**3.**	**4.**
$\frac{1}{9}$ of 18 = ?	$\frac{1}{9}$ of 54 = ?	$\frac{1}{9}$ of 72 = ?
$\frac{1}{9}$ of 63 = ?	$\frac{1}{9}$ of 36 = ?	$\frac{1}{9}$ of 45 = ?
$\frac{1}{9}$ of 27 = ?	$\frac{1}{9}$ of 81 = ?	$\frac{1}{9}$ of 90 = ?

5. *Divide by 9, giving the quotients and remainders:*

38	69	30	22	67	51	31	55	37
79	28	47	60	21	39	66	44	68
42	88	61	80	46	50	78	32	65
74	29	56	49	41	77	26	59	89
40	76	48	35	20	57	33	85	53
71	84	62	25	82	70	86	58	23
34	73	83	43	52	24	64	75	87

Practice daily until you can give the answers in $1\frac{1}{4}$ minutes.

Divide and check by multiplication:

1.	**2.**	**3.**	**4.**	**5.**	**6.**
9)828	9)513	9)252	9)585	9)351	9)432

MULTIPLYING AND DIVIDING BY 9

Find the products and check by division:

1.	2.	3.	4.	5.	6.	7.	8.
72	83	95	64	87	59	36	48
9	9	9	9	9	9	9	9

Divide and check by multiplication:

9.	10.	11.	12.	13.	14.
9)585	9)432	9)504	9)657	9)828	9)783

15. The outfits for our baseball nine cost $135. That was how much per man?

16. Frank earned $56.25 in 9 weeks last summer. How much did he average per week?

PROBLEMS

1. There are 186 pages in Mary's new book. She has read 98 pages. How many more has she to read?

2. Frank is 12 years old and his father is 40. How much older is his father?

3. A crate of chickens weighed 126 pounds. The empty crate weighed 19 pounds. How much did the chickens weigh?

4. It cost a camping party $47.95 for a week. How much a day did it cost them?

5. Frank's father drove 192 miles in 8 hours. How many miles per hour did he average?

OUR BASEBALL TEAM

1. It takes 9 boys for a baseball team. At \$2.25 each, how much will their suits cost?

2. How much will it cost to buy sweaters for the team at \$4.35 each?

3. If their shoes cost \$3.65 a pair, how much will the 9 pairs cost?

4. Find the cost of 5 baseballs at 65¢ each, 4 bats at 85¢ each, 2 catcher's gloves at \$1.15 each, and a mask costing \$1.80.

5. Our team played the Highland Park School one Saturday. The fare was \$0.85 each for the round trip. How much did it cost for the 9?

6. On another Saturday a truck took the team to play in another town and charged \$5.85 for the trip. What was each boy's share of the expense?

7. The cost of fruit and sandwiches for lunch was \$3.06. What was each boy's share of the expense?

8. To pay expenses, the teams charged admission to the games. The total gate receipts one season were $213.50, of which each team got half. The expenses of our team were $98.30. How much had we left?

9. At one game, each team got half the gate receipts, which were $47.30. Our expenses were $2.15 each. How much had we left?

10. At another game each team got half of $35.80. Our expenses were $1.95 each. Did we make expenses?

11. We are planning to buy a complete new outfit. A dealer offers us an outfit for $82.35. If we buy it, how much will it cost each member of the team?

EARNING AND SAVING MONEY

1. Frank earned $1.85 one week, $2.15 the next, and $1.90, $2.40, and $1.50 respectively for the next three weeks. How much did he earn in the 5 weeks?

2. What were Frank's average earnings for each week?

3. If Frank earns an average of $1.95 a week, how much can he earn in 9 weeks?

4. George wants to buy a bicycle costing $16.75. He is earning $2.40 a week. In 6 weeks he will lack how much of earning enough to buy it?

5. Walter is saving to buy a coaster costing $9.65. How much per week will he have to save in order to save enough in 5 weeks?

6. It is 7 weeks until Christmas. Will now has $4.25. If he can save $1.65 each week for 7 weeks, how much will he have?

7. There are 52 weeks in a year. How much can Ned save in a year if he averages $2 each week?

8. Walter mows Mr. Smith's lawn each week. He gets $0.65 each week. How much can he earn in 9 weeks?

9. Frank works 2 hours each afternoon during the 5 school days and 8 hours on Saturday for Mr. Smith, who has a grocery store. Mr. Smith pays him 25¢ an hour during the week and 30¢ an hour on Saturdays. How much does he earn in a week?

10. Helen cares for Mrs. Walter's baby one hour each day except Sunday. She gets 15¢ per hour. How much does she earn per week?

DRILL EXERCISES

Give the missing number:

1.	2.	3.	4.
$9 + ? = 17$	$? + 6 = 15$	$9 + ? = 13$	$49 \div ? = 7$
$? + 8 = 15$	$8 + ? = 15$	$? + 8 = 13$	$54 \div ? = 9$
$4 \times ? = 36$	$? \times 7 = 56$	$? \div 7 = 9$	$? \times 9 = 45$
$9 \times 8 = ?$	$42 \div ? = 7$	$? \div 6 = 8$	$8 \times ? = 56$
$9 - ? = 7$	$63 \div ? = 9$	$9 \times ? = 63$	$? - 9 = 7$
$64 \div ? = 8$	$9 \times ? = 54$	$8 \times ? = 48$	$? + 8 = 17$
$72 \div 9 = ?$	$7 + 6 = ?$	$? \div 7 = 5$	$17 - ? = 9$
$? \times 7 = 63$	$81 \div 9 = ?$	$? \div 6 = 7$	$13 - ? = 8$

SHOPPING PROBLEMS

1. Frank bought a pair of skates costing \$1.75 and a coaster costing \$6.45. How much did both cost? How much had he left of \$10 that he had in his bank?

\$1.75	
6.45	
\$8.20	*There are two problems. The first is to find what both cost. The next is to find the difference between the cost of both and the \$10.*
\$10.00	
8.20	
\$1.80	

2. Could you get the answer to the last part of problem 1 by subtracting \$1.75 from \$10 and then subtracting \$6.45 from the answer you got? Try it. Which way do you like better? Why?

3. Fred had \$4.35 and earned \$2.50 more. If he spends \$1.85 for repairs for his bicycle, how much will he have left? What two problems will you have to solve?

4. Nell's mother gave her \$5 for a birthday present. She bought a doll costing \$1.98 and some ribbon costing 54¢. How much had she left? What two problems will you have to solve?

5. Helen's mother bought 4 yards of dress goods at \$1.48 per yard, and some trimming costing \$1.42. How much did all cost? Are there two problems in this one? If so, what are they?

PROBLEMS

1. John saved \$3.20 one month and \$2.45 the next. How much does he lack of having enough to buy a coaster costing \$7.35, if this is all the money he has?

2. Fred is going to try to earn enough in 3 months to buy a bicycle costing \$17.40. How much will he have to average each month?

3. If Fred earns \$6.25 one month and \$5.80 the next, how much will he have to earn the third month to have enough for the bicycle costing \$17.40?

4. Mary earned \$1.65 each week for 4 weeks caring for Mrs. Brown's baby after school and on Saturdays. If she spends \$2.85 of it for Christmas presents for her two sisters, how much will she have left?

5. Four boys rented a tent for two weeks for a camping trip. They paid \$5 rent for it. Their other expenses for the trip were \$17.60. If they shared the expenses equally, how much did it cost each?

6. Helen saw a toy sewing machine that cost \$4.80. She counted the money in her bank and found that she had \$5.35. If she buys the machine, how much will she have left?

7. Nell wanted a little desk costing \$4. She has \$2.85. She said, "I'll save my 50¢ allowance for 3 weeks and I'll have enough to buy it." If she does, will she have any money left? How much?

PROBLEMS

1. Ralph went with his father on an automobile trip. When they started, the speedometer read "2168 miles." When they stopped for lunch it read "2240 miles." How far had they traveled?

2. They started at 9 : 30 in the morning and stopped for lunch at 12 : 30. They averaged how many miles per hour?

3. When they got back home the reading of the speedometer was "2324 miles." How far did they travel after lunch?

4. They traveled 4 hours after lunch. How many miles per hour did they average?

5. They bought 4 gallons of gasoline on the trip. At 23¢ per gallon, how much did it cost?

6. They also bought 4 quarts of oil at 32¢ a quart. How much did it cost?

7. Ralph's father paid for the gasoline and oil with a $5 bill. How much change did he get?

8. On the trip they bought 4 baskets of apples at 85¢ a basket and paid for them with a $5 bill. How much change did they get?

9. Ralph wants to buy a bicycle that costs $16.75. He has $12. How much more does he need to buy it?

A TEST IN SOLVING PROBLEMS

Be sure that you know how to work each problem before you begin. After you solve a problem, check your work to be sure that you made no mistake.

1. After giving his brother 65 of his marbles, James had 86 left. How many had he at first?

2. Sixty children went to the woods for a picnic. Twenty-eight of them were boys. How many girls in the party?

3. Frank's father bought 8 boxes of apples at $3.65 a box. Find how much they cost him.

4. Walter had $5.65, earned $3.80, and spent $4.35. How much did he then have?

5. Ralph had 135 marbles. He gave his brother one third of them. How many did he have left?

6. After Nell spent $3.78 for a dress she had $1.67 left. How much had she at first?

7. It cost 9 Boy Scouts $42.75 for a hiking trip. How much was that for each?

8. There were 136 passengers on a boat. At the first stop 35 got off and 50 got on. How many were then on the boat?

9. Helen's mother uses 4 pounds of butter each week. How many pounds will she use in a year (52 weeks)?

10. Mrs. Brown's hat cost $13.75 and her coat five times as much. How much did both cost?

TESTS IN ADDITION

Test A

You should add these 8 in 2 minutes or less after copying them or by laying a piece of paper below each and writing the sums.

1.	2.	3.	4.	5.	6.	7.	8.
8	2	7	9	2	7	8	7
7	9	3	1	3	2	4	2
6	5	6	6	9	5	7	8
4	6	4	7	5	9	6	4
3	8	5	8	6	6	3	8

Test B

You should add these 8 in less than 4 minutes.

1.	2.	3.	4.	5.	6.	7.	8.
65	38	76	39	87	29	84	75
29	57	29	86	65	87	39	38
76	69	84	25	38	96	75	96
31	84	97	96	79	65	96	78

Test C

You should do these 7 in 5 minutes.

1.	2.	3.	4.	5.	6.	7.
286	376	435	567	639	726	936
327	524	296	648	847	384	492
296	487	874	265	976	976	786
584	968	345	321	381	825	598

TESTS IN SUBTRACTION

Test A

(Time, 2 min.)

1.	2.	3.	4.	5.	6.	7.	8.
96	80	85	96	82	74	93	52
27	36	47	48	66	16	67	35

9.	10.	11.	12.	13.	14.	15.	16.
75	64	91	85	63	81	64	72
46	38	69	47	45	45	19	38

Test B

(Time, 3 min.)

1.	2.	3.	4.	5.	6.	7.
387	546	629	894	618	783	695
169	173	182	329	253	275	247

8.	9.	10.	11.	12.	13.	14.
716	945	753	926	783	674	829
592	380	263	456	577	366	660

Test C

(Time, 4 min.)

1.	2.	3.	4.	5.	6.
9267	8620	9631	7036	8420	7264
1342	3486	7525	5218	1615	1936

7.	8.	9.	10.	11.	12.
5764	6345	8409	6342	8963	9638
3258	1937	3674	1936	2871	2419

TESTS IN MULTIPLICATION

Test A

(Time, 3 min.)

1.	2.	3.	4.	5.	6.	7.	8.
28	94	76	57	95	86	72	96
7	3	5	7	6	8	4	6

9.	10.	11.	12.	13.	14.	15.	16.
76	84	38	58	92	57	84	95
9	5	9	6	7	6	7	7

Test B

(Time, 3 min.)

1.	2.	3.	4.	5.	6.	7.
208	390	704	630	907	860	540
7	6	5	8	8	9	7

8.	9.	10.	11.	12.	13.	14.
609	630	804	370	890	708	950
5	7	6	9	4	6	9

Test C

(Time, 4 min.)

1.	2.	3.	4.	5.	6.
298	567	913	486	597	387
7	6	8	6	5	9

7.	8.	9.	10.	11.	12.
426	864	937	875	986	786
8	7	6	8	5	4

TESTS IN DIVISION

Test A

(Time, 4 min.)

1.	2.	3.	4.	5.	6.
5)379	6)856	7)936	8)768	5)763	8)975
7.	**8.**	**9.**	**10.**	**11.**	**12.**
9)896	7)964	6)907	5)967	7)897	6)998

Test B

(Time, 5 min.)

1.	2.	3.	4.	5.
5)7693	8)7965	7)9728	6)9768	9)8765
6.	**7.**	**8.**	**9.**	**10.**
7)9261	8)9568	6)8976	5)7651	7)8984

Test C

(Time, 4 min.)

1.	2.	3.	4.	5.
7)6350	6)4083	9)7248	5)3454	6)4856
6.	**7.**	**8.**	**9.**	**10.**
6)4683	7)4265	8)4725	7)6345	8)6460

Test D

(Time, 4 min.)

1.	2.	3.	4	5.
2)1396	3)2901	4)3576	5)3995	6)5034
6.	**7.**	**8.**	**9.**	**10.**
7)6874	8)6152	9)8334	8)7224	9)3582

MARY'S VACATION TRIP

Last August Mary went with her father, mother, and two brothers in their new car to spend a month at a cottage on a little lake in the mountains.

1. When they stopped for lunch her father said, "We have driven just 110 miles in 5 hours." Mary said, "That is an average of 22 miles per hour." Was she right?

2. Her father said, "At that rate we can make the rest of the trip in 6 hours." How much farther did he think they had to go?

3. Mary said, "If we leave here at 1 : 30, we shall get to the lake in time for a sail in our new boat." When did she expect to get to the lake?

4. They got to the lake at 6 : 30. That was how much earlier than Mary expected to arrive? How long were they in making the afternoon trip?

5. They had found that the afternoon trip was but 115 miles. How many miles per hour did they average?

6. At 7:15 the children all went with their father for a sail. Their mother said, "You must be back by 8:30." How long could they stay out?

HOW MARY'S BROTHERS EARNED MONEY

Mary's two brothers, Frank and Walter, said, "We'll have plenty of time to swim and go boat riding and make some money too. Let's try it." This is what they did.

1. One day they gathered 2 gallons of wild raspberries and sold them to the campers at 20¢ a quart. How much did they earn?

2. In all they picked and sold 7 gallons of berries at 20¢ per quart. How much did they make?

3. Each evening they went to a farmhouse and got milk for some neighbors. They earned $1.25 each week for 4 weeks. How much did they earn?

4. Walter acted as caddie for a golf player part of the time. He made 65¢ a day at this for 8 days. How much did he earn?

5. The boys sold bait to the fishers. In all they sold 9 dozen minnows at 35¢ a dozen. How much did they earn?

6. During the summer they earned $18.95 and wanted to divide it equally. How much would that be for each?

VACATION TRIPS

1. Last summer George went with his family on a six-day automobile trip. When they left home, the reading of the speedometer was 3760 miles. When they got back home, it was 4588 miles. How many miles did they travel? How many miles per day did they average?

2. They used an average of 8 gallons of gasoline a day. At 23¢ a gallon, how much did the gasoline cost per day? How much for the 6 days?

3. They bought 9 quarts of oil on the trip at 30¢ a quart. What was the average cost of oil per day?

4. They found when they got home that they had paid out $166.50 for meals and hotel bills. How much did this average per day?

5. There were 5 in the party. What was the average cost of each for hotel bills?

6. Frank and his two brothers went with their father on a trip. They drove 768 miles in 8 days. What was the average number of miles per day?

7. Their total expense was: food, $63.38; gasoline, $10.40; oil, $2.10; incidental expenses, $3.80. What was the total cost?

8. The total cost was an average of how much per day?

9. Can you bring in problems about any vacation trip you had during the summer?

READING AND WRITING DOLLARS AND CENTS

$3.25 is read " 3 dollars and 25 cents."

1. Read: $15.75; $20.20; $3.03; $0.95; $0.05; $0.50.

2. *Write, using the dollar mark ($) and period (.):*

5 dollars and 60 cents	40 cents
10 dollars and 10 cents	90 cents
8 dollars and 5 cents	9 cents

$2.35 is 235 cents.

3. *Write as cents:*

$1.75	$10.35	$8.10	$3.00
$3.90	$ 2.01	$5.05	$4.00

4. *Write as dollars and cents:*

345 cents	1040 cents	800 cents
530 cents	1000 cents	950 cents

5. How many dimes in 20¢? In 30¢? In 40¢?

35 cents is 3 dimes and 5 cents.

6. *How many dimes and cents in:*

45¢	32¢	56¢	$0.85	$0.24
72¢	81¢	19¢	$0.72	$0.39

7. A quarter of a dollar is 25¢. How many 5-cent pieces make a quarter?

8. A dime and how many 5-cent pieces make a quarter?

9. A half dollar is 50¢. How many dimes make a half dollar? How many 5-cent pieces?

ADDING AND SUBTRACTING NUMBERS THAT MEAN MONEY

1. James earned $3.25 one week, $2.90 the next, and $3.05 the next. How much did he earn in three weeks?

$3.25	*Do not forget to write $ before the first num-*
2.90	*ber to be added.*
3.05	*Be sure to write $ in the sum, and to sepa-*
$9.20	*rate dollars and cents with a period.*

Add and check:

2.	3.	4.	5.	6.
$5.60	$3.98	$4.36	$1.87	$9.00
1.85	2.46	1.89	3.68	1.68
2.96	3.57	3.47	2.45	5.13
3.48	4.28	2.78	3.81	2.48

7.	8.	9.	10.	11.
$3.08	$5.19	$1.75	$4.28	$3.84
4.00	.98	3.58	1.79	1.79
1.96	1.46	2.91	2.95	3.87
5.38	3.87	3.86	1.78	5.09

12.	13.	14.	15.	16.
$3.60	$1.98	$2.60	$4.30	$0.98
5.08	3.07	3.89	2.07	1.64
6.25	5.79	1.78	1.98	5.72
1.86	2.84	5.03	3.55	3.76

17. Walter wants to buy a bicycle that costs \$16.75. He has \$9.80. How much more money does he need?

\$16.75 9.80 \$ 6.95	*Think, "0 and 5 are 5." Write 5.* *Think, "8 and 9 are 17." Write 9, carry 1.* *Carrying 1, think, "10 and 6 are 16." Write 6.*

This is right, for \$9.80 and \$6.95 make \$16.75.

Subtract and check:

18.	19.	20.	21.	22.
\$14.35	\$16.05	\$17.40	\$16.00	\$12.30
6.87	9.10	9.86	4.35	9.08

23. Frank earned \$16.50 and spent \$5.75 of it. How much did he save?

24. Jack paid \$1.20 for a hundred papers and sold them for \$2.00. How much did he make?

25. Ralph earned \$5.38 selling papers and \$3.65 running errands. How much did he earn?

26. Walter saw a Meccano set marked \$3.98 and a sled marked \$5.75. How much will both cost?

27. Helen's mother bought a coat for herself costing \$60 and one for Helen costing \$16.98. How much more did the mother's coat cost?

MULTIPLYING AND DIVIDING NUMBERS THAT MEAN MONEY

1. Frank earned $3.85 per week for 8 weeks. How much did he earn in all?

$3.85 8	*Be sure to write $ in the product and to separate dollars and cents with a period.*

Multiply and check by going over the work a second time:

2.	3.	4.	5.	6.
$7.28 6	$9.42 8	$8.37 5	$5.67 9	$4.68 7
7.	**8.**	**9.**	**10.**	**11.**
$6.09 7	$4.38 6	$7.14 7	$2.96 8	$1.96 7

12. Eight boys and girls went on a picnic. The entire expense was $10.24. How much did it cost each?

8)$10.24	*Be sure to write $ in the answer and to separate dollars and cents with a period.*

Divide and check by multiplication:

13.	14.	15.	16.	17.
5)$8.75	6)$9.54	8)$12.64	7)$16.45	5)$23.60
18.	**19.**	**20.**	**21.**	**22.**
9)$26.55	8)$38.32	6)$40.62	9)$32.76	8)$41.92

HOW A CLERK COUNTS CHANGE

A clerk has the different coins in separate boxes. If you make a 12¢ purchase and hand him a 25¢ piece, he picks up three 1¢ pieces, counting "13, 14, 15." Then he picks up a dime and counts "25," or 2 five-cent pieces and counts "20, 25," and gives you the 13¢ with your purchase.

If you make a 34¢ purchase and hand him a 50¢ piece, he will pick up 1¢ and count "35"; then 5¢ and count "40"; and then a dime and count "50," handing you the 16¢.

If you make a 63¢ purchase and hand him $1, he will say "65" as he picks up 2 cents; "75" as he picks up a dime; and "$1" as he picks up a quarter.

Pretending that you are a clerk, count the change from the following:

1. 11¢, 14¢, and 16¢ purchases each paid with 25¢.

2. 36¢, 41¢, and 18¢ purchases each paid with 50¢.

3. 15¢, 19¢, and 22¢ purchases each paid with 50¢.

4. 28¢, 35¢, and 57¢ purchases each paid with $1.

5. 32¢, 63¢, and 87¢ purchases each paid with $1.

6. Tell how you would count back the change from the following when $2 is given in payment:

88¢; 64¢; $1.13; $1.25; $1.64; $1.87.

PLAYING CASHIER

These children are playing cashier. The girl at the cashier's desk is the cashier for a large gas company. Each child has a gas bill and is paying the cashier with toy money made from bits of cardboard. If the cashier makes a mistake in "counting back" the change, she loses her place and the one correcting her becomes cashier.

Would you like to make toy money and some gas bills and play the game? If so, let each pupil in one half of the class make "gas bills" from \$2.01 to \$4.99, while the other half each make bills from \$6.01 to \$9.99. Make *hard* ones like \$3.47 or \$7.38. Do not make *easy* ones like \$3.50 or \$7.25. Also make 2 or 3 coins of each kind and some \$1, \$2, and \$5 bills, so the cashier will be able to make change.

The cashier has boxes containing 1¢, 5¢, 10¢, 25¢, and 50¢ pieces; also \$1, \$2, and \$5 bills. The pupils each have a \$5 or a \$10 bill. Each pupil is given a bill as "Gas \$2.13," "Gas \$3.48," "Gas \$6.32," etc. When the class is large, there may be several clerks. After the bills are paid, they are redistributed and paid again.

A REVIEW OF ADDITION

1. You should practice until you can write all the sums in less than a minute and have all correct.

7	8	3	9	6	7	6	4	7	5
8	5	8	2	6	6	5	7	7	7
9	9	5	7	9	9	3	8	8	8
6	8	9	9	9	4	9	6	8	4

2. Try to write all the sums in one minute.

19	17	19	15	19	13	17	12	19
6	8	8	8	5	8	9	9	9
14	16	13	15	18	14	18	17	14
9	7	9	6	6	7	8	7	8

3. Try to write all the sums in two minutes.

8	9	6	7	9	6	9	4	4	8
8	8	2	8	6	7	9	8	9	8
9	8	9	8	9	8	8	9	9	6
7	8	7	8	9	6	9	8	5	6
7	7	6	7	9	8	9	9	9	9
9	8	9	6	6	7	4	7	8	8

Try to add all six in two minutes.

4.	5.	6.	7.	8.	9.
324	416	806	560	168	246
168	287	137	137	247	135
507	390	98	240	360	214

ADDING BY ENDINGS

Before you can add long columns, you must be able to add any two-figured number to any one-figured number.

Practice on this table until you can say all in 3 minutes or write them in 5 minutes.

1.	3	13	23	43	11.	4	14	34	64
	8	8	8	8		7	7	7	7
2.	3	23	43	13	12.	4	24	64	34
	9	9	9	9		8	8	8	8
3.	5	15	35	55	13.	4	14	44	64
	6	6	6	6		9	9	9	9
4.	6	16	26	46	14.	5	15	35	65
	6	6	6	6		7	7	7	7
5.	5	25	45	35	15.	6	16	46	86
	8	8	8	8		7	7	7	7
6.	5	35	45	75	16.	6	26	56	96
	9	9	9	9		8	8	8	8
7.	6	36	76	96	17.	7	37	67	27
	9	9	9	9		7	7	7	7
8.	8	18	38	98	18.	8	18	28	68
	8	8	8	8		9	9	9	9
9.	7	27	47	67	19.	8	18	48	28
	9	9	9	9		7	7	7	7
10.	9	29	69	99	20.	2	92	96	87
	9	9	9	9		8	8	7	6

PRACTICE IN ADDITION

See how many you can add in just 5 minutes. Do not copy the figures. After you have added for 5 minutes, check each by adding in the opposite direction. You should be able to add about 6 or 7 of these in 5 minutes.

1.	2.	3.	4.	5.	6.
862	169	875	658	428	923
794	947	496	971	659	498
538	385	371	439	713	987
475	754	965	724	964	756
916	628	842	865	758	416

7.	8.	9.	10.	11.	12.
578	695	268	196	293	438
694	731	497	358	948	279
173	946	619	974	897	548
569	785	835	683	576	769
248	482	574	245	146	156

13.	14.	15.	16.	17.	18.
568	489	483	945	549	843
791	873	297	678	876	927
349	925	584	728	827	854
274	764	796	415	514	976
685	516	165	639	936	615

A REVIEW IN SUBTRACTION

1. Write the forty-five differences in three minutes.

10	15	13	11	14	13	12	16	10
1	6	9	2	9	5	3	7	8
11	13	10	14	12	15	11	17	12
8	4	2	5	8	7	3	8	9
10	14	12	13	10	17	14	13	11
9	8	4	6	3	9	6	7	6
12	10	16	11	14	12	10	15	11
7	6	8	5	7	5	4	8	7
11	13	12	10	15	11	16	10	18
4	8	6	5	9	9	9	7	9

Write any six differences in three minutes.

2.	3.	4.	5.	6.	7.
4276	5326	6184	7265	8431	6134
1839	1813	2635	5327	1617	2652
8.	**9.**	**10.**	**11.**	**12.**	**13.**
5026	6304	7850	5061	7308	9063
1614	2132	5675	2847	2535	6728
14.	**15.**	**16.**	**17.**	**18.**	**19.**
6013	3206	5780	8036	7605	8710
1842	1853	1936	2763	5394	5675

PRACTICE IN SUBTRACTION

See how many you can subtract in 5 minutes. Do not copy the figures. After you have subtracted all you can in 5 minutes, check each by adding the answer to the smaller number to see if it gives the larger. You should be able to subtract 12 in 5 minutes.

1.	2.	3.	4.	5.	6.
4906	9705	7906	8047	9034	3809
1832	1926	4637	2628	2741	1974

7.	8.	9.	10.	11.	12.
7680	4101	5240	5307	3046	4022
1949	1230	1912	1736	1194	2718

13.	14.	15.	16.	17.	18.
3450	4027	6310	4908	7507	6204
1482	1873	4706	1299	3924	2493

19.	20.	21.	22.	23.	24.
8308	5840	9308	8430	4064	6402
3159	2656	5846	3258	1383	3846

25.	26.	27.	28.	29.	30.
5820	7023	4703	5063	9064	7603
2492	2341	2188	3427	6847	5449

READING AND WRITING LARGE NUMBERS

80,000 is read "eighty thousand."
800,000 is read "eight hundred thousand."

1. *Read:*

30,000	300,000	35,000	325,000
40,000	400,000	42,000	460,000

Read:

2. The population of Detroit increased from 465,766 in 1910 to 993,678 in 1920.

3. The population of Boston increased from 670,585 in 1910 to 748,060 in 1920.

4. The population of Washington, D.C., increased from 331,069 in 1910 to 437,571 in 1920.

Write in words:

5. 65,000	7. 7500	9. 6345
6. 105,000	8. 17,250	10. 15,428

11. Find in a newspaper or magazine some large numbers of five or six figures and read them to the class.

1,000,000 is read "one million."

12. Read: 2,000,000; 3,000,000; 4,000,000.

13. Read: The population of New York City is 5,621,151.

14. Read: The population of Chicago is 2,701,212.

15. Read: The population of Philadelphia is 1,823,158.

SUBTRACTING LARGE NUMBERS

1. The population of Detroit was 993,678 in 1920. The population of Cleveland was 796,841. Which was larger? How much?

2. The population of Boston was 748,060 in 1920. The population of Baltimore was 733,826. Which was larger? How much?

3. The population of Cleveland increased from 560,663 in 1910 to 796,841 in 1920. Find the increase.

Subtract and check your answers:

4.	5.	6.	7.
514,365	628,426	730,450	621,348
162,748	135,618	514,239	416,164

8.	9.	10.	11.
840,395	786,315	685,347	843,926
316,189	268,406	438,196	529,658

12.	13.	14.	15.
836,409	736,048	731,960	587,306
153,247	584,939	184,258	269,184

16.	17.	18.	19.
506,375	760,289	803,947	610,824
189,138	296,134	578,629	348,263

PRACTICE IN MULTIPLICATION

1. Practice until you can say the 30 products in 30 seconds or write them in 1 minute.

$3 \times 3 =$	$4 \times 4 =$	$6 \times 7 =$	$5 \times 6 =$	$4 \times 8 =$
$4 \times 5 =$	$3 \times 4 =$	$7 \times 9 =$	$9 \times 8 =$	$6 \times 3 =$
$5 \times 7 =$	$5 \times 8 =$	$3 \times 8 =$	$5 \times 9 =$	$4 \times 6 =$
$9 \times 6 =$	$7 \times 4 =$	$7 \times 3 =$	$8 \times 8 =$	$6 \times 6 =$
$7 \times 7 =$	$6 \times 8 =$	$9 \times 9 =$	$4 \times 9 =$	$9 \times 3 =$
$3 \times 5 =$	$7 \times 8 =$	$2 \times 9 =$	$8 \times 2 =$	$5 \times 5 =$

2. Give the missing numbers in 30 seconds.

$3 \times ? = 9$	$4 \times ? = 20$	$5 \times ? = 35$	$9 \times ? = 54$
$4 \times ? = 16$	$3 \times ? = 12$	$8 \times ? = 40$	$7 \times ? = 28$
$6 \times ? = 42$	$7 \times ? = 63$	$3 \times ? = 24$	$3 \times ? = 21$
$5 \times ? = 30$	$9 \times ? = 72$	$5 \times ? = 45$	$8 \times ? = 64$
$4 \times ? = 32$	$6 \times ? = 18$	$4 \times ? = 24$	$6 \times ? = 36$
$7 \times ? = 49$	$6 \times ? = 48$	$9 \times ? = 81$	$4 \times ? = 36$
$3 \times ? = 27$	$5 \times ? = 15$	$7 \times ? = 56$	$5 \times ? = 25$

3. *Multiply each by 8 and add 6:*

9 3 7 6 8 4 5

4. *Multiply each by 9 and add 7:*

3 7 9 6 4 8 5

5. *Give the answer:*

$7 \times 9 + 6 = ?$	$7 \times 7 + 5 = ?$	$8 \times 3 + 7 = ?$
$6 \times 7 + 5 = ?$	$8 \times 7 + 3 = ?$	$9 \times 6 + 8 = ?$
$8 \times 4 + 4 = ?$	$9 \times 4 + 7 = ?$	$3 \times 6 + 3 = ?$
$7 \times 5 + 6 = ?$	$6 \times 6 + 5 = ?$	$5 \times 7 + 4 = ?$

A REVIEW IN MULTIPLICATION

2 4 6 8 9 7 5 3

1. Multiply each by 7 and add 5. By 8 and add 6. By 9 and add 5. By 6 and add 3.

Find the products of any six in two minutes.

2.	3.	4.	5.	6.	7.
341	256	825	493	387	746
6	6	6	6	6	6

8.	9.	10.	11.	12.	13.
193	284	765	279	358	164
7	7	7	7	7	7

14.	15.	16.	17.	18.	19.
278	369	541	728	945	613
8	8	8	8	8	8

20.	21.	22.	23.	24.	25.
426	813	597	547	638	912
9	9	9	9	9	9

26. Take the products you get in any line and divide by the multiplier and see if you get the multiplicand. If you do not, you made a mistake either in multiplying or dividing. If you made a mistake, correct it.

Exercise 26 tells how to check work in multiplication.

A NEW THING TO LEARN ABOUT MULTIPLICATION

1. How much will 2 oranges cost at 4¢ each?

2. How much will 4 oranges cost at 2¢ each?

You see that $2 \times 4¢$ is as much as $4 \times 2¢$.

3. How much will 4 apples cost at 3¢ each?

4. How much will 3 apples cost at 4¢ each?

You see that $4 \times 3¢$ is as much as $3 \times 4¢$.

5. How many are 3×8? Then how many are 8×3?

6. How many are four 9's? Then how many are nine 4's?

7. To trim a Christmas tree, Helen wants 18 red paper bells costing 4¢ each. How much will they cost?

You know that they will cost $18 \times 4¢$. You do not know how to multiply by 18.

But you know that $18 \times 4¢$ is as much as $4 \times 18¢$, which you can find.

$$\begin{array}{r} 18 \\ \times\ 4 \\ \hline 72 \end{array}$$

Cost = 72¢

Since you have changed this to a problem that gives the same answer as the one you want, write 18, and not 18¢. Then below, write "Cost = 72¢."

8. Lucy was going to have a party. Her mother bought 36 little cakes costing 3¢ each. How much did they cost?

$$\begin{array}{r} 36 \\ 3 \\ \hline 108 \end{array}$$

Think, "36 × 3¢ is as much as 3 × 36¢." Then write 3 × 36 as shown here. Think, "3 × 36 = 108. So 36 × 3¢ = 108¢, or $1.08."

9. Some boys were going on a hike. They had 24 sandwiches made for their lunch. At 4¢ each, how much did they cost?

In multiplication we usually choose as multiplier the number having the fewer figures.

EARNING MONEY

1. One hot day in July Frank and his sister had a lemonade stand on their lawn and sold lemonade to those passing. They bought 3 dozen lemons at 35¢ a dozen and 4 pounds of sugar at 9¢ a pound. How much did the lemons and sugar cost?

2. They spent 9¢ for straws and 15¢ for ice. How many glasses of lemonade at 5¢ a glass did they have to sell to get back the cost of everything they bought?

3. You saw in problem 2 that they had to sell 33 glasses to get back the cost. After that much is sold, the rest they sell will be *profit*. How much profit will they have if they sell 50 glasses?

4. Some other children, planning to sell lemonade, said, "If we pay out \$1.25 for all the material, how much shall we have to sell at 5¢ a glass to make 75¢?" Can you tell?

5. Some children said, "If we plan to make 80 glasses, we must buy $3\frac{1}{2}$ dozen lemons at 40¢ a dozen, 5 pounds of sugar at 8¢ a pound, and 25¢ worth of ice. Suppose we sell only 60 glasses at 5¢, will it pay us?" Can you tell?

6. If it should rain and turn cooler after the lemonade is made and they sell but 30 glasses at 5¢, find how much they will lose?

7. Frank sold popcorn at 5¢ a bag. It cost him \$1.75 for 100 bags. If he sold it all, how much did he make?

8. Helen made 30 paper dolls and sold them at 10¢ each. If the material cost her \$0.85, how much did she make?

9. Ralph sold balloons on circus day. He paid 45¢ a dozen for them and sold them at 5¢ each. How much did he make on 6 dozen?

10. Jack and Billie bought 100 ice cream cones and enough ice cream to fill them for \$2.80 and sold them all at 5¢ each. How much did they make?

11. Walter paid \$1.20 for 100 papers and sold them at 2¢ each. How much did he make?

12. Try to make up some good problems about earning money.

REVIEW OF DIVISION FACTS

Give the quotients and remainders. You should be able to say them in 1 minute or to write them in $2\frac{1}{2}$ minutes.

1.	2.	3.	4.	5.	6.
2)3	2)13	2)5	2)9	2)7	2)11
2)15	3)4	2)17	3)5	2)19	3)10
3)7	3)13	3)8	3)14	3)20	3)26
3)17	3)29	3)19	3)23	3)28	4)5
4)7	3)22	4)6	3)11	3)25	3)16
4)11	4)9	4)17	4)10	4)14	4)23
4)21	4)25	4)13	4)27	4)18	4)29
4)15	4)30	4)19	4)34	4)26	4)35
4)33	4)37	4)39	4)31	4)38	4)22

EXERCISES IN WRITTEN DIVISION

1.	2.	3.	4.	5.
2)3596	2)7314	2)9738	2)7936	2)9572
6.	**7.**	**8.**	**9.**	**10.**
3)7632	3)5814	3)8631	3)7972	3)8223
11.	**12.**	**13.**	**14.**	**15.**
4)7332	4)5972	4)9556	4)7924	4)9116

PROBLEMS IN MULTIPLICATION AND DIVISION

1. Mr. Brown bought each of his two sons a handcar. They cost $3.98 each. Find the cost of both.

2. Four boys bought a large coaster costing $9.60 and shared the cost equally. How much did it cost each?

3. Ralph earns $1.65 a week delivering papers. How much can he earn in 4 weeks?

4. There are 36 pupils in a certain room. If they march 3 abreast, how many ranks will there be?

5. A fourth-grade class collected $1.08 to buy colored bells to decorate a Christmas tree. If they buy 3-cent bells, how many can they buy? How many can they buy if they select 4-cent bells?

6. Ralph has 72 marbles. He told his brother that he could have $\frac{1}{4}$ of them if he could tell him how many that would be. How much is $\frac{1}{4}$ of 72?

7. John wanted an Erector set costing $5.48. His father told him that he would give him the rest when he had saved $\frac{1}{4}$ of the price himself. How much will John have to save?

8. Henry had a bicycle that cost him $25.50. He said to Frank, "I'll take a third less than it cost me." For how much would he sell it?

9. In 4 weeks Henry sold $7.36 worth of eggs from his flock of hens. That was an average of how much a week?

DIVIDING BY 5, 6, AND 7

Give quotients and remainders:

I

5)6	6)28	5)22	5(27	6)25	5)26
5)19	6)21	6)7	5)7	6)31	5)32
5)29	6)38	5)46	5)17	6)58	5)41
5)11	6)46	6)13	5)21	6)19	5)48
5)34	6)52	6)27	5)38	6)35	5)44
5)39	5)12	6)17	5)43	6)45	6)22
6)8	5)28	6)32	6)9	6)51	6)36
5)49	5)9	6)41	6)11	5)8	6)15
6)14	5)33	6)49	6)56	5)13	6)23
6)43	6)20	5)36	6)53	7)61	7)41
7)8	7)20	7)58	5)42	6)29	6)50
6)55	6)34	5)47	7)84	7)48	7)60
7)68	7)17	7)30	7)36	7)46	7)52
5)18	6)59	6)16	7)47	7)59	5)31
7)54	7)67	7)40	7)18	7)9	5)37
5)16	6)40	6)26	7)13	5)23	6)10

II

6)47	6)33	7)53	7)19	7)24	7)43
6)57	6)39	7)23	7)27	7)57	6)44
7)66	5)14	7)26	7)11	6)46	7)37
7)39	7)16	7)44	5)24	7)69	7)32
7)51	7)10	7)38	7)15	7)65	7)12
7)33	7)25	7)62	7)45	7)31	7)55
7)64	7)50	7)22	7)29	6)59	5)49

EXERCISES IN WRITTEN DIVISION

See how many you can divide in 10 minutes.

1.	2.	3.	4.	5.
5)7635	5)9720	5)7985	5)9360	5)8735
6.	**7.**	**8.**	**9.**	**10.**
6)8634	6)7962	6)8724	6)9546	6)5292
11.	**12.**	**13.**	**14.**	**15.**
7)3696	7)5789	7)6636	7)5292	7)6258
16.	**17.**	**18.**	**19.**	**20.**
5)9765	6)8514	7)5523	7)6692	7)3472
21.	**22.**	**23.**	**24.**	**25.**
7)5523	6)3870	5)3930	7)6468	6)4374

PROBLEMS IN MULTIPLICATION AND DIVISION

1. Our committee has collected $1.38 to buy colored bells to trim a Christmas tree. At 6¢ each, how many can they buy?

2. Five boys went on a hike and shared the expenses equally. The expenses were $3.45. How much did it cost each?

3. A fourth-grade class had a party. There were 34 in the class and each brought 7¢ to pay for the refreshments. How much did they all bring?

4. Each member of a class of 38 brought 6¢ toward buying and trimming a Christmas tree. How much did all bring?

5. Harry's father drove 154 miles in 7 hours. How many miles an hour did he average?

6. Henry found that the feed for his hens cost him $9.48 for 6 weeks. That was an average of how much per week?

7. Henry sold an average of $3.25 worth of eggs each week. How much did he get for his eggs for 6 weeks?

8. Mary heard her mother say that the food for the family cost them $17.15 one week. That was an average of how much a day?

9. Mr. Brown planned an automobile trip. He said, "We must average 95 miles a day to make the trip in 6 days." Find how many miles he planned to drive.

EXERCISES IN DIVIDING BY 8 AND 9

Give the quotient and remainder:

8)51	9)21	8)17	8)78	8)13	9)19
9)26	8)52	9)22	8)18	8)79	8)14
8)21	9)27	8)53	9)23	9)18	8)73
9)32	8)22	9)28	8)54	9)24	8)20
9)54	9)33	8)23	9)29	8)55	9)25
8)45	9)55	9)34	8)24	9)30	8)56
9)60	8)46	9)56	9)35	8)25	9)31
8)27	9)61	8)47	9)57	9)36	8)26
9)37	9)58	8)48	9)62	8)28	9)66
8)9	9)10	9)43	9)47	9)51	9)53
9)15	9)38	9)11	9)44	9)48	8)70
8)57	9)67	8)29	9)63	8)49	9)59
9)72	8)58	9)68	8)30	9)63	8)50
8)74	8)10	9)39	9)12	9)45	9)49
9)51	8)75	9)16	9)40	9)13	9)46
8)15	9)52	8)11	9)17	9)41	9)14

Give the quotient and remainder:

8)33	9)73	8)59	9)69	8)31	9)65
9)78	8)34	9)74	8)60	9)70	8)32
8)63	9)79	8)35	9)75	8)61	9)71
9)84	8)64	9)80	8)36	9)76	9)77
8)39	9)85	8)65	9)81	8)37	8)62
8)69	8)40	9)86	8)66	9)82	8)38
8)44	9)89	8)41	9)87	8)67	9)83
8)72	8)71	8)43	8)42	9)88	8)68

Divide and check by multiplication:

1.	2.	3.	4.	5.
7)1533	7)1666	7)1932	7)2443	7)2688
6.	**7.**	**8.**	**9.**	**10.**
7)2989	7)4417	7)6496	7)2296	8)1904
11.	**12.**	**13.**	**14.**	**15.**
8)2792	8)2208	8)3072	8)2624	8)3416
16.	**17.**	**18.**	**19.**	**20.**
9)1971	9)3952	9)5679	9)3843	9)7659
21.	**22.**	**23.**	**24.**	**25.**
8)2952	8)3824	7)4296	7)5173	9)6921

SAVING MONEY FOR A PURPOSE

1. John is saving money to buy a bicycle costing $15.75. To save that much in 9 weeks will require an average of how much a week?

2. Helen is saving money to buy a desk costing $18. She now has $12.80. To save the rest in 8 weeks will require an average of how much a week?

3. Frank has $5.75. He is earning $1.45 a week after school. If he saves it all for 7 weeks, how much money will he have toward buying a bicycle that he wants?

4. Ralph is trying to save enough in 5 weeks to buy 9 hens that he can buy for $1.20 each. How much must he average each week?

5. John can save 8¢ each time he walks to school instead of riding. How many times will he have to walk to save $2?

6. Walter thinks that he can save $1.85 per week from what he earns on a paper route. If he can, that will be how much in 8 weeks?

7. Will wants a bicycle costing $18. He says, "If I can save $1.65 each week for 9 weeks during the summer, how much more will I need?" Can you tell him?

8. Donald wants a coaster costing $12.85. He said, "I am earning $1.75 a week, so I can earn about enough in 7 weeks." Tell how much more or less than the cost of the coaster he can earn in 7 weeks.

A REVIEW OF TERMS USED

$4.85	are called the **addends**
3.26	
1.35	
$9.46	is called the **sum**
$9.30	is called the **minuend**
5.78	is called the **subtrahend**
$3.52	is called the **difference**
$3.45	is called the **multiplicand**
9	is called the **multiplier**
$31.05	is called the **product**

The multiplier and multiplicand are called the **factors** of the product.

The **multiplicand** would be one of the equal addends if the answer was found by addition.

The multiplicand may be a number that does not name any particular thing, as 245, 375, called **abstract numbers**; or it may be a number that names some particular thing as $25, 36 miles, or any such number, called **concrete numbers.**

The **multiplier** simply shows how many times the multiplicand would have to be written as an addend if the answer was to be found by addition, and so it is a number without a name, or an **abstract number.**

The **product** is what the sum would be if found by addition, and so it must be the same kind of number as the multiplicand.

The **divisor** is $4)\underline{965}$ is the **dividend**

The **quotient** is 241, 1 is the remainder

Since $7 \times 9¢ = 63¢$, $7)\underline{63¢}$ and $9¢)\underline{63¢}$

$9¢$ $\quad$ 7

When the dividend is a concrete number, the quotient also is concrete if the divisor is an abstract number; but the quotient is abstract when the divisor and dividend are both concrete.

Tell the quotient:

1.	2.	3.	4.	5.
$9¢)\underline{72¢}$	$8)\underline{40 \text{ mi.}}$	$7)\underline{63 \text{ cakes}}$	$5¢)\underline{40¢}$	$6¢)\underline{42¢}$
$7)\underline{63 \text{ ft.}}$	$9¢)\underline{54¢}$	$\$2)\underline{\$18}$	$5)\underline{40¢}$	$7)\underline{35¢}$
$8)\underline{\$56}$	$9)\underline{45¢}$	$3)\underline{\$21}$	$5 \text{ ft.})\underline{25 \text{ ft.}}$	$8)\underline{80 \text{ mi.}}$
$\$7)\underline{\$42}$	$7 \text{ yd.})\underline{42 \text{ yd.}}$	$4)\underline{72¢}$	$8 \text{ mi.})\underline{40 \text{ mi.}}$	$6¢)\underline{36¢}$

6. Make a problem that would use each of the exercises given above.

For the first part of exercise **1** *you can say, "John saves 9¢ each day. How long will it take him to save enough to buy a knife costing 72¢?"*

For the first part of exercise **2** *you can say, "A boat sailed 40 miles in 8 hours. That was an average of how many miles an hour?"*

PROBLEMS

A HALLOWE'EN PARTY

1. Our class is going to have a Hallowe'en party. Our committee has decided that we need 75 doughnuts. We can buy nice large ones at 3¢ each. How much will 75 cost?

2. We need 48 apples. We can get good ones at 3¢ each. How much will they cost?

3. We need 8 pumpkins for lanterns and $\frac{1}{2}$ of a candle for each. We can get the pumpkins at 15¢ each and the candles at 4¢ each. How much shall we have to pay for pumpkins and candles?

4. Our committee finds that all this will cost us $5.05. Do you think that they are correct?

5. They have collected $7.20. After buying these, how much will they have left?

6. Of the $2.15 left, they are going to spend 95¢ for crepe paper. That will leave how much?

7. They decided to spend the remainder of the money for paper caps at 3¢ each. How many can they buy?

8. Should you like to plan a Hallowe'en party? If so, decide what you need for decorations and refreshments and find what they will cost.

A THANKSGIVING DINNER

1. Mary helped her mother plan for a Thanksgiving dinner. Her mother said, "There are 5 of us. Six dollars should be enough for us to spend for the dinner." How much would that average for each?

2. Mary found what a small 9-pound turkey at 54¢ a pound would cost, and how much would be left from $6.00 for other things. Can you find out how much the turkey would cost and how much money would be left?

3. Mary suggested that a 6-pound duck would be enough for their dinner and that it could be bought for 48¢ a pound. She said, "That will cost $1.98 less than a 9-pound turkey." Was she right?

4. If they buy the 6-pound duck, how much of the $6.00 will be left for other things?

5. Would you like to find the cost of a Thanksgiving dinner at the prices charged in your neighborhood?

A NUTTING PARTY

1. Eight boys went on a nutting party one Saturday. They agreed to share the expenses equally. Their lunch cost $2.72. How much was that for each?

2. Their carfare was 16¢ each. One boy paid for all and each paid his share of all the expenses when they returned. How much carfare did he pay for all?

3. They gathered 3 bushels of nuts. There are 32 quarts in a bushel. How many quarts did they have to divide?

4. If they divide the 96 quarts equally, how much will each boy get for his share?

5. Two of the boys came late and so they took but 6 quarts each as their share. How many quarts did that leave for the other 6 boys?

6. The 84 quarts divided equally among the other 6 boys was how much for each?

MULTIPLYING BY 11 AND 12

1. *Find:*

11	11	11	11	11	11	11	11
2	3	4	5	6	7	8	9

2. Since $2 \times 11 = 22$, $11 \times 2 = ?$

3. Since $3 \times 11 = 33$, $11 \times 3 = ?$

4. *Write and learn the "11 times" table:*

$11 \times 2 =$ $11 \times 4 =$ $11 \times 6 =$ $11 \times 8 =$
$11 \times 3 =$ $11 \times 5 =$ $11 \times 7 =$ $11 \times 9 =$

5. *Find:*

12	12	12	12	12	12	12	12
2	3	4	5	6	7	8	9

6. *From the products in exercise 5, write and learn the "12 times" table:*

$12 \times 2 =$ $12 \times 4 =$ $12 \times 6 =$ $12 \times 8 =$
$12 \times 3 =$ $12 \times 5 =$ $12 \times 7 =$ $12 \times 9 =$

7. *Tell how many 11's in:*

44 22 33 77 66 88 55 99

8. *Tell how many 12's in:*

36 84 60 96 24 108 48 72

9. Each of the 11 men on our football team bought a sweater costing $5. What was the cost of all?

10. What did their shoes cost at $4 per pair?

11. There are 12 inches in a foot. How many inches in 2 ft.? In 3 ft.? In 4 ft.? In 5 ft.? In 6 ft.? In 7 ft.? In 8 ft.? In 9 ft.?

SOME USES OF THE "12 TIMES" TABLE

1. How many things in a dozen? In 2 dozen? In 3 dozen? In 4 dozen? In 5 dozen? In 6 dozen? In 7 dozen? In 8 dozen? In 9 dozen?

2. A boy bought oranges at 40¢ a dozen and sold them at 5¢ each. How much did he make on 8 dozen?

3. George bought pencils at 35¢ a dozen and sold them at 5¢ each. How much did he make on 6 dozen?

4. Frank bought golf balls at $7 a dozen and sold them at 85¢ each. How much did he make on a dozen? On 5 dozen?

5. Walter bought grape fruit at $1 per dozen and sold them at 15¢ each. How much did he make on each dozen?

6. When eggs are 60¢ a dozen, how much is that for 1 egg? How much apiece are they when 48¢ a dozen?

7. Frank is just 4 feet tall. How many inches is that?

8. George is 4 ft., 5 in. tall. Give his height in inches.

Give the number of inches in:

9. 2 ft., 7 in. = —— in.
10. 4 ft., 2 in. = —— in.
11. 3 ft., 9 in. = —— in.
12. 5 ft., 6 in. = —— in.
13. 6 ft., 8 in. = —— in.
14. 8 ft., 4 in. = —— in.
15. 7 ft., 6 in. = —— in.
16. 9 ft., 2 in. = —— in.

Give the number of feet and inches in:

17. 40 in. = —— ft., —— in.
18. 70 in. = —— ft., —— in.
19. 80 in. = —— ft., —— in.
20. 90 in. = —— ft., —— in.
21. 30 in = —— ft., —— in.
22. 50 in. = —— ft., —— in.
23. 65 in. = —— ft., —— in.
24. 75 in. = —— ft., —— in.

HOW TO MULTIPLY BY 11 AND 12

1. The high school football team bought 11 outfits at $9.35 each. How much did all cost?

$ 9.35 11 $102.85	*Think, "11 × 5 = 55." Write 5. Carry 5. Think, "11 × 3 + 5 = 38." Write 8. Carry 3. Think, "11 × 9 + 3 = 102." Write 102.*

2. Frank was offered $1.45 each for his dozen hens. That would be how much for all?

$ 1.45 12 $17.40	*Think, "12 × 5 = 60." Write 0. Carry 6. Think, "12 × 4 + 6 = 54." Write 4. Carry 5. Think, "12 × 1 + 5 = 17." Write 17.*

3. Frank's father pays $65 per month rent. He asked Frank to find how much a year he paid. Can you find how much it was?

Multiply:

4.	5.	6.	7.	8.	9.
324	465	284	379	291	293
11	11	11	11	11	11

10.	11.	12.	13.	14.	15.
213	324	596	475	285	192
12	12	12	12	12	12

FRACTIONAL PARTS

1. Sometimes, in making a dress, you want but a *part of* a yard of cloth or a *part of* a yard of lace or ribbon.

Sometimes you buy but *part of* a pound of candy. Sometimes you eat but a *part of* a bar of chocolate. Let us see what these parts are called.

2. Look at this picture of a bar of chocolate. It is divided into how many equal parts? We may call one of the pieces "one of the four equal parts" of it. We may call three of the pieces "three of the four equal parts" of it. But it takes too long to say this.

One of the four equal parts is called *one fourth* and is written $\frac{1}{4}$.

Three of the four equal parts are called *three fourths*. This is written $\frac{3}{4}$.

3. This long stick of candy is divided into five equal parts. Describe one piece. Two pieces. Three pieces. Four pieces. That is, say, "One piece is one fifth of it. Two pieces are —— fifths of it"; and so on.

One of the five equal parts is $\frac{1}{5}$.

Two of the five equal parts is $\frac{2}{5}$.

Three of the five equal parts are ——.

Four of the five equal parts are ——.

4. If a pie is divided into six equal pieces, what part should you call each piece? Tell what you should call 2 pieces of it. 3 pieces of it. 5 pieces of it.

5. When a pie is divided into 8 equal pieces, what should you call each piece? What should you call 3 of the pieces? 5 of the pieces? 7 of the pieces?

$\frac{1}{4}$ $\frac{3}{4}$ $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{1}{6}$ $\frac{5}{6}$ $\frac{1}{8}$ $\frac{5}{8}$ are called **fractions.**

PARTS OF AN INCH AND FOOT

1. Look at your ruler. Into how many small divisions is each inch divided?

One of the two equal parts is called *one half*, written $\frac{1}{2}$.

One of the four equal parts is called *one fourth*, written $\frac{1}{4}$.

One of the eight equal parts is called *one eighth*, written $\frac{1}{8}$.

2. How many fourths in one half?

3. How many eighths in one half? In one fourth?

$\frac{2}{4} = \frac{1}{2}$ $\frac{4}{8} = \frac{1}{2}$

4. On the back of your ruler you may find marks dividing it into halves and fourths. If not, divide it into halves and fourths.

5. How many inches in $\frac{1}{2}$ of a foot? In $\frac{1}{4}$ of a foot?

6. *Fill the blank spaces:*

$\frac{1}{2}$ foot = —— inches. $\frac{1}{3}$ foot = —— inches.
$\frac{1}{4}$ foot = —— inches. $\frac{2}{3}$ foot = —— inches.
$\frac{3}{4}$ foot = —— inches. $\frac{1}{6}$ foot = —— inches.

7. *Which is more:*

$\frac{1}{2}$ foot or $\frac{1}{3}$ foot? $\frac{1}{2}$ inch or $\frac{1}{4}$ inch?
$\frac{1}{2}$ foot or $\frac{1}{4}$ foot? $\frac{1}{4}$ inch or $\frac{1}{8}$ inch?
$\frac{1}{4}$ foot or $\frac{1}{3}$ foot? $\frac{1}{8}$ inch or $\frac{1}{2}$ inch?

8. Make a line that you think is $1\frac{1}{2}$ inches long. Then measure it. How accurate were you?

PARTS OF A FOOT, AND PARTS OF A YARD

1. Draw a line 1 ft. long on the blackboard.

2. Divide the line into four equal parts. To do it think, "$\frac{1}{4}$ of 12 in. = —— in." Then mark the line off into four parts each —— inches long.

3. Show the class $\frac{1}{4}$ ft; $\frac{2}{4}$ ft; $\frac{3}{4}$ ft.

4. Draw another line 1 ft. long and divide it into six equal parts. How long will each part be?

5. What part of a foot is each of the six equal parts?

6. Show the class $\frac{1}{6}$ ft.; $\frac{2}{6}$ ft.; $\frac{3}{6}$ ft.; $\frac{5}{6}$ ft.

7. How could you show $\frac{1}{3}$ ft.? $\frac{2}{3}$ ft.?

8. Draw three lines on the blackboard, one $\frac{1}{6}$ ft. long; below it one $\frac{1}{4}$ ft. long; and below that one $\frac{1}{3}$ ft. long. Which is longest? Which is shortest?

9. $1\frac{2}{3}$ ft. means "1 ft. and $\frac{2}{3}$ of a foot." Make a line on the blackboard $1\frac{2}{3}$ ft. long.

10. Draw a line $1\frac{3}{4}$ ft. long. One $1\frac{5}{6}$ ft. long.

11. Draw a line on the blackboard 1 yd. long.

12. Divide it into 3 equal parts. What part of a yard will you call each part? How many inches in $\frac{1}{3}$ of a yard?

13. Draw a line $\frac{2}{3}$ yd. long.

14. Draw a line $1\frac{1}{3}$ yd. long.

15. Draw a line 1 yd. long and divide it into six equal parts.

Think, "Each part will be $\frac{1}{6}$ of 36 inches long."

16. Draw a line 1 yd. long and divide into four equal parts. Show the class $\frac{3}{4}$ yd. $\frac{2}{4}$ yd.

17. Draw a line $1\frac{3}{4}$ yd. long. One $1\frac{1}{6}$ yd. long.

FINDING A PART OF A NUMBER

Give the missing number:

I	II	III
$\frac{1}{3}$ of 12 = ——	$\frac{1}{5}$ of 15 = ——	$\frac{2}{3}$ of 15 = ——
$\frac{2}{3}$ of 12 = ——	$\frac{2}{5}$ of 15 = ——	$\frac{1}{6}$ of 18 = ——
$\frac{1}{4}$ of 12 = ——	$\frac{3}{5}$ of 15 = ——	$\frac{2}{6}$ of 18 = ——
$\frac{2}{4}$ of 12 = ——	$\frac{4}{5}$ of 15 = ——	$\frac{3}{6}$ of 18 = ——
$\frac{3}{4}$ of 12 = ——	$\frac{1}{3}$ of 15 = ——	$\frac{5}{6}$ of 18 = ——

IV	V	VI
$\frac{1}{8}$ of 16 = ——	$\frac{1}{8}$ of 24 = ——	$\frac{1}{8}$ of 40 = ——
$\frac{2}{8}$ of 16 = ——	$\frac{3}{8}$ of 24 = ——	$\frac{3}{8}$ of 40 = ——
$\frac{3}{8}$ of 16 = ——	$\frac{5}{8}$ of 24 = ——	$\frac{5}{8}$ of 40 = ——
$\frac{5}{8}$ of 16 = ——	$\frac{7}{8}$ of 24 = ——	$\frac{7}{8}$ of 40 = ——
$\frac{7}{8}$ of 16 = ——	$\frac{1}{8}$ of 32 = ——	$\frac{1}{8}$ of 48 = ——

BUYING PARTS OF A YARD

1. If a yard of dress goods costs 36¢, how much will $\frac{3}{4}$ yd. cost?

Think, "$\frac{3}{4}$ yd. will cost $\frac{3}{4}$ of 36¢."

2. Mary bought $\frac{5}{6}$ yd. of lace to trim her dress. It was 60¢ a yard. How much did $\frac{5}{6}$ yd. cost?

3. Nell wanted $\frac{2}{3}$ yd. of ribbon for a hair ribbon. It was 30¢ a yard. How much did $\frac{2}{3}$ yd. cost?

4. Helen bought $2\frac{1}{4}$ yd. of ribbon at 80¢ a yard. How much did it cost?

\$ .80	*Think, "$\frac{1}{4}$ of \$.80 = \$.20." Write 20.*
$2\frac{1}{4}$	*Think, "2 × \$.80 = \$1.60." Write*
20	*down 160.*
160	*Add 20 and 160. Cost = \$1.80.*
\$1.80	

TWO WAYS OF FINDING A PART OF A NUMBER

1. Find $\frac{3}{4}$ of 136.

First Way		Second Way
4)136	*We may divide by 4 and multiply*	136
34	*by 3. Or multiply by 3 first, and*	3
3	*then divide by 4. For both give the*	4)408
102	*same answer.*	102

Note to the Teacher. — The first method is the one that comes from the meaning of the process; but in future work, where there is a remainder after the division, the second method is the more economical. Hence it is the method used throughout these texts.

2. Nell bought $3\frac{5}{6}$ yd. of cloth at \$2.58 per yard. How much did it cost?

\$2.58	
$3\frac{5}{6}$	*Find $\frac{5}{6}$ of \$2.58 by multiplying by 5 and*
6)1290	*dividing by 6. Then find $3 \times$ \$2.58.*
215	*Then add. Put a period in the product*
774	*to show that it is dollars and cents.*
\$9.89	

3. Find the cost of $2\frac{3}{4}$ yd. of cloth at \$1.40 per yard.

4. Find the cost of $4\frac{3}{8}$ yd. of cloth at \$1.76 per yard.

A REMAINDER IN DIVISION

1. Fred had a stick of candy 5 inches long. He divided it into 4 equal pieces. How long was each piece?

$4\overline{)5 \text{ in.}}$
$1\frac{1}{4}$ in.

Think, "5 ÷ 4 = 1 and 1 remaining." So the 1 in. must also be divided by four. That means that 1 in. is divided into 4 equal parts. So each is $\frac{1}{4}$ in. long.

2. Frank has a strap 11 ft. long that he wishes to divide into 4 equal pieces. How long will each piece be?

$4\overline{)11 \text{ ft.}}$
$2\frac{3}{4}$ ft.

11 ÷ 4 = 2 and 3 remaining. The 3 ft. remaining is written over 4 and gives $\frac{3}{4}$ ft.

3. If 4 oranges cost 15¢, how much is that for each?

Think, "15 ÷ 4 = 3 and 3 remaining. So 15¢ ÷ 4 = $3\frac{3}{4}$¢."

Give the cost of each when you get:

4. 5 for 12¢.
5. 8 for 15¢.
6. 6 for 25¢.
7. 8 for 25¢.
8. 3 for 10¢.
9. 4 for 25¢.
10. 3 for 20¢.
11. 6 for 20¢.

12. Nell bought 6 bananas for 20¢. How much was that for each?

Think "20 ÷ 6 = 3 and 2 remaining. So 20¢ ÷ 6 = $3\frac{2}{6}$¢." Both 2 and 6 of $\frac{2}{6}$ may be divided by 2. So $\frac{2}{6} = \frac{1}{3}$. The answer in its simplest form is $3\frac{1}{3}$¢.

When both terms of a fraction have the same factor, it should be divided out so as to give a simpler form. $\frac{2}{4} = \frac{1}{2}$, $\frac{3}{6} = \frac{1}{2}$, $\frac{6}{8} = \frac{3}{4}$, and so on.

WRITING REMAINDERS AS FRACTIONS

1. Divide 476 by 3.

$3\overline{)476}$ $158\frac{2}{3}$

Instead of writing 2 that remained as a "remainder" write it above 3, giving the fraction $\frac{2}{3}$.

Write the quotients:

2.	3.	4.	5.	6.	7.
2)365	2)513	3)575	3)764	3)824	4)765
8.	**9.**	**10.**	**11.**	**12.**	**13.**
4)567	4)738	4)935	4)657	5)638	5)736
14.	**15.**	**16.**	**17.**	**18.**	**19.**
5)948	5)827	6)735	6)863	6)926	6)759
20.	**21.**	**22.**	**23.**	**24.**	**25.**
7)963	7)895	8)975	8)765	8)463	9)874

BUSHELS, PECKS, AND QUARTS

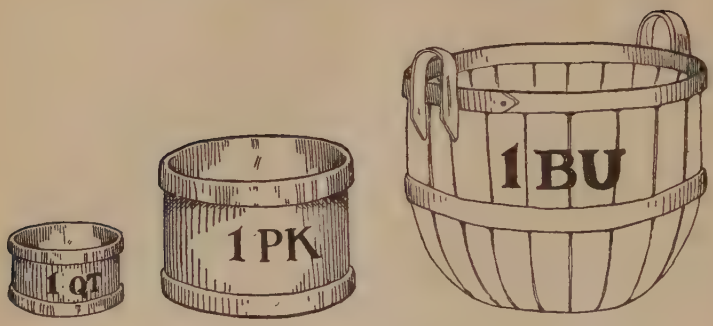


TABLE OF DRY MEASURE

8 quarts (qt.) = 1 peck (pk.)
4 pecks = 1 bushel (bu.)

1. A peck is one of the four equal parts of a bushel. So it is $\frac{1}{4}$ of a bushel. Three pecks are what part of a bushel?

2. When potatoes are $1.80 per bushel, how much are 3 pecks worth?

3. Since 8 quarts make a peck, a quart is what part of a peck? 2 quarts are what part of a peck? ($\frac{2}{8} = \frac{1}{4}$)

4. 4 quarts are what part of a peck? ($\frac{4}{8} = \frac{1}{2}$)

5. How many 4-quart baskets in a bushel? When peaches are selling at 35¢ for a 4-quart basket, how much is that per bushel?

6. A half-bushel basket contains how many quarts?

7. A half bushel is how many pecks? How many quarts?

8. Which is cheaper, to buy potatoes at \$2.25 per bushel or at 60¢ a peck? How much is saved on each bushel?

9. When potatoes were selling at 90¢ per 16-quart baskets, a dealer charged \$1.75 per bushel. How much a bushel is saved by buying them per bushel?

10. *Fill the blank spaces:*

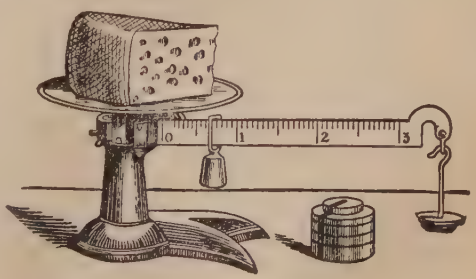
$\frac{1}{2}$ bu. = —— qt.	$\frac{1}{2}$ bu. = —— pk.
$\frac{1}{4}$ bu. = —— qt.	$\frac{1}{2}$ pk. = —— qt.
$\frac{3}{4}$ bu. = —— qt.	$\frac{1}{4}$ pk. = —— qt.
$\frac{1}{8}$ bu. = —— qt.	$\frac{3}{4}$ pk. = —— qt.

POUNDS AND OUNCES

16 ounces = 1 pound
14 ounces are written " 14 oz."
3 pounds are written " 3 lb."

1. *Fill the blank spaces:*

$\frac{1}{2}$ lb. = —— oz.
$\frac{1}{4}$ lb. = —— oz.
$\frac{3}{4}$ lb. = —— oz.
$\frac{1}{8}$ lb. = —— oz.
$\frac{3}{8}$ lb. = —— oz.



2. An ounce is "one of the 16 equal parts of a pound," or $\frac{1}{16}$ of a pound.

2 ounces = $\frac{2}{16}$ or $\frac{1}{8}$ of a pound.

When both terms of a fraction have a common factor, divide it out.

3 ounces = $\frac{3}{16}$ of a pound.

4 ounces = $\frac{4}{16}$ or —— of a pound.

In this way, write out what 5, 6, 7, 8, and so on to 15, ounces equal.

3. $1\frac{1}{2}$ lb. = —— oz.; $1\frac{1}{4}$ lb. = —— oz.; $1\frac{3}{8}$ lb. = —— oz.

4. At 40¢ a pound, how much will $1\frac{1}{2}$ lb. of candy cost?

5. At 50¢ a pound, how much will $2\frac{1}{2}$ lb. of butter cost?

6. When steak is 42¢ a pound, how much will $1\frac{1}{2}$ lb. cost?

7. When chocolate candy is 80¢ a pound, how much should $\frac{3}{4}$ of a pound cost?

8. How much will $1\frac{1}{2}$ lb. of chocolate candy cost at 60¢ a pound?

MEASURES OF TIME

1. How long does it take the minute hand to go from XII to I? From I to II?

2. How long does it take the minute hand to go from XII around to XII again?

3. How long does it take the second hand to go from 10 to 20? From 10 to 30?

4. How long does it take the second hand to go from 60 around to 60 again?

5. How long does it take the hour hand to go from I to III? From III to VI? From III around to III?

6. How many times does the hour hand go entirely around in a day and night?

It is 15 min. past 10 o'clock.
This is written 10 : 15.

TABLE OF TIME

60 seconds (sec.)	= 1 minute (min.)
60 minutes	= 1 hour (hr.)
24 hours	= 1 day (da.)

From midnight to midnight is called 1 day.
A.M. means before noon. P.M. means past noon.

1. *Fill the blank spaces:*

$\frac{1}{2}$ hr. = —— min. $\frac{1}{2}$ min. = —— sec.
$\frac{1}{4}$ hr. = —— min. $\frac{1}{4}$ min. = —— sec.
$\frac{3}{4}$ hr. = —— min. $\frac{3}{4}$ min. = —— sec.

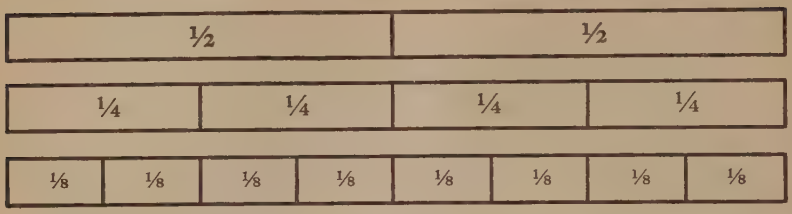
2. From 9 A.M. to 1 P.M. is how long?

3. From 9 A.M. to 9 : 45 A.M. is how long?

4. How long is it from 10 : 30 A.M. to 3 : 15 P.M.?

5. How long is it from 3 : 30 P.M. until 8 P.M.?

CHANGING FRACTIONS TO SMALLER TERMS



1. You have found several fractions in your work that could be changed to smaller terms by dividing both terms by the same number. This gives a fraction of the same value, but simpler.

From this picture you can see that $\frac{4}{8}$ is the same as $\frac{2}{4}$ or as $\frac{1}{2}$.

2. Make a line and divide to show that $\frac{4}{6} = \frac{2}{3}$.

When both terms of a fraction have a common divisor (factor), divide them each by it so as to get a simpler fraction.

Change to smaller terms:

3.	4.	5.	6.	7.
$\frac{4}{8}$	$\frac{12}{16}$	$\frac{8}{12}$	$\frac{15}{20}$	$\frac{6}{12}$
$\frac{6}{9}$	$\frac{4}{10}$	$\frac{6}{16}$	$\frac{10}{12}$	$\frac{16}{18}$
$\frac{8}{10}$	$\frac{6}{15}$	$\frac{18}{24}$	$\frac{24}{36}$	$\frac{14}{16}$

Divide and give the fractions in smallest terms:

8. $22 \div 8$	11. $36 \div 8$	14. $124 \div 8$
9. $48 \div 9$	12. $57 \div 9$	15. $146 \div 6$
10. $66 \div 8$	13. $32 \div 6$	16. $183 \div 9$

AT THE CANDY STORE

Hard candy, per pound	20¢	Nut fudge, per pound	60¢
Caramels, per pound	40¢	Fancy mixed, per pound	50¢
Chocolate, per pound	80¢	Mints, per pound	30¢

1. Find the cost of $\frac{1}{2}$ lb. of hard candy. Of caramels.
2. Find the cost of $\frac{1}{4}$ lb. of nut fudge. Of chocolate.
3. Find the cost of $\frac{1}{2}$ lb. of mints. Of fancy mixed.
4. How much hard candy can you buy for 10¢?

Think, "10 of 20¢ is $\frac{10}{20}$ or $\frac{1}{2}$." So $\frac{1}{2}$ lb.

5. How much of the caramels can you buy for 30¢?

Think, "30 of 40¢ is $\frac{30}{40}$ or $\frac{3}{4}$." So $\frac{3}{4}$ lb.

6. What part of a pound of chocolate can you buy for 20¢? For 40¢? For 60¢?

AT THE FRUIT STAND

Plums, 3¢ each; 2 for 5¢	Oranges, 5¢ each; 6 for 25¢
Peaches, 4¢ each; 3 for 10¢	Grape fruit, 10¢ each; 3 for 25¢
Apples, 2¢ each; 6 for 10¢	Pears, 4¢ each; 4 for 15¢

1. When you buy 2 plums for 5¢, what does it cost you for each? How much more do plums cost if you buy one at a time than if you buy 2 at a time?
2. When 3 peaches cost 10¢, what does each one cost you? How much more does a peach cost bought one at a time than 3 at a time?

3. When 6 apples cost 10¢, what does each one cost you? ($\frac{4}{6} = \frac{2}{3}$.) How much more does an apple cost bought one at a time than 6 at a time?

4. When 6 oranges cost 25¢, what does each one cost you? How much more does an orange cost when bought one at a time than 6 at a time?

5. When 3 grape fruit cost 25¢, what does each one cost you? How much less is this than when bought 1 at a time?

6. When 4 pears cost 15¢, how much is that for each? How much less is this than when bought one at a time?

7. At the rate of 2 for 5¢, how much will a dozen plums cost?

8. At the rate of 3 for 10¢, how much will a dozen peaches cost?

9. At the rate of 6 for 10¢, how much will a dozen apples cost?

10. At the rate of 6 for 25¢, how much will a dozen oranges cost?

11. At the rate of 3 for 25¢, how much will a dozen grape fruit cost?

12. At the rate of 4 for 15¢, how much will a dozen pears cost?

A REVIEW OF MULTIPLICATION

1. Give the products in 1 minute or less. You must have all correct.

2	3	3	4	4	5	5	4	5
2	3	2	2	3	2	3	4	4
5	6	6	7	7	6	6	7	6
5	2	3	2	3	5	4	4	6
7	7	6	8	3	8	7	8	6
7	5	7	2	8	4	8	5	8
8	9	7	9	5	9	2	9	9
8	9	9	8	9	4	9	6	3

2. *Give the products without a pencil:*

I	II	III	IV	V
2×13	2×14	2×15	2×16	2×17
2×18	2×19	3×13	3×14	3×15
3×16	3×18	3×19	4×13	4×14
4×15	4×16	4×17	4×18	4×19
5×13	5×14	5×16	5×17	5×18
5×19	6×13	6×14	6×15	6×17
6×18	6×19	7×13	7×14	7×15
7×16	7×18	7×19	8×13	8×14
8×15	8×16	8×17	8×18	8×19
9×13	9×14	9×15	9×16	9×17

MULTIPLYING BY 10 OR 100

1. By addition find 3×10. Find 3×100.
2. Since $3 \times 10 = 30$, $10 \times 3 = ?$
3. Since $3 \times 100 = 300$, $100 \times 3 = ?$

Give the products:

4.	5.	6.	7.
$10 \times 4 =$	$10 \times 2 =$	$100 \times 2 =$	$100 \times 8 =$
$10 \times 6 =$	$10 \times 8 =$	$100 \times 5 =$	$100 \times 6 =$
$10 \times 7 =$	$10 \times 9 =$	$100 \times 7 =$	$100 \times 4 =$

To multiply a whole number by 10, annex 0.
To multiply a whole number by 100, annex 00.

NOTE TO THE TEACHER. — Be sure that the pupils do not get the notion that annexing a zero to dollars and cents multiplies it by 10.

8. If trolley rides cost 7¢ each, how much will you have to spend to ride 10 times?

9. If 10 pupils are planning a picnic and want 3 sandwiches each, how many must they take?

10. If 34 pupils each give 10¢ toward a class party, how much will that make?

11. *Give the products:*

17	24	35	54	46	37	60	70
10	10	10	10	10	10	10	10

12. *Give the products:*

25	38	46	24	57	68	60	70
100	100	100	100	100	100	100	100

MULTIPLYING BY 20, 30, 40, ETC.

1. Find 3×20. Then 20×3 = what?
2. Find 4×30. Then 30×4 = what?
3. Find 3×60. Then 60×3 = what?

You have found that:

2	4	3
30	30	60
60	120	180

Look at these and see that the products were the products of 3×2, 3×4, and 6×3 with a zero annexed to each. So you see that:

To multiply by 20, multiply by 2 and annex 0;
To multiply by 30, multiply by 3 and annex 0;
And so on for 40, 50, and 60, and any number ending in 0.

Find the products:

4.	5.	6.	7.	8.	9.
24	35	46	54	65	40
20	30	40	30	50	30

10. Thirty pupils each brought 25¢ to buy a Thanksgiving dinner and other food for a poor family. How much did they bring?

\$.25	*This is the way to write it. Be sure to*
30	*point off two places for cents and use the dol-*
\$7.50	*lar sign.*

MULTIPLYING BY 20, 30, 40, ETC.

1. Some children are giving an entertainment to raise money for a phonograph for the school. They expect to sell 80 tickets at 35¢ each. If they do, how much will they raise?

2. Frank had eggs for sale. One month he sold 30 dozen at 75¢ a dozen. How much did he get for all?

3. The next month he sold 34 dozen at 70¢ a dozen. How much did he get?

$34 \times \$.70 = \$23.80$ $\underline{70}$ 2380	*Instead of using 34 for the multiplier, use 70. For $34 \times 70 = 70 \times 34$. Write such problems as this one is written.*

4. To trim a Christmas tree, a class bought 15 skeins of tinsel at 20¢ a skein. How much did it cost?

5. At an entertainment 247 tickets were sold at 20¢ each. How much money was taken in from the sale?

6. Forty children are going to the country for a picnic next Saturday. A man agrees to take them in a large bus for 35¢ each for the round trip. How much will he get for the trip?

7. Walter gathered 18 boxes of strawberries one day and sold them for 20¢ a box. How much did he get for all?

DRILL EXERCISES IN MULTIPLICATION

1. *Give the products:*

A	B	C	D
$20 \times 8 =$	$30 \times 5 =$	$40 \times 5 =$	$50 \times 4 =$
$20 \times 6 =$	$30 \times 6 =$	$40 \times 3 =$	$50 \times 6 =$
$20 \times 7 =$	$30 \times 8 =$	$40 \times 6 =$	$50 \times 5 =$
$20 \times 4 =$	$30 \times 7 =$	$40 \times 7 =$	$50 \times 9 =$
$20 \times 9 =$	$30 \times 4 =$	$40 \times 9 =$	$50 \times 7 =$
$20 \times 3 =$	$30 \times 9 =$	$40 \times 8 =$	$50 \times 8 =$

E	F	G	H
$60 \times 3 =$	$70 \times 4 =$	$80 \times 7 =$	$90 \times 6 =$
$60 \times 5 =$	$70 \times 8 =$	$80 \times 5 =$	$90 \times 9 =$
$60 \times 4 =$	$70 \times 5 =$	$80 \times 8 =$	$90 \times 4 =$
$60 \times 7 =$	$70 \times 9 =$	$80 \times 4 =$	$90 \times 8 =$
$60 \times 6 =$	$70 \times 7 =$	$80 \times 9 =$	$90 \times 5 =$
$60 \times 8 =$	$70 \times 6 =$	$80 \times 6 =$	$90 \times 7 =$

2. If a class of 30 each contributes 7¢ toward refreshments for a party, how much will all contribute?

3. If 3 sandwiches are to be allowed for each of a party of 30, how many will be needed?

Find the products:

4. 20×36	10. 40×68	16. 20×40
5. 30×48	11. 50×67	17. 30×50
6. 20×57	12. 40×47	18. 40×30
7. 30×76	13. 50×84	19. 60×80
8. 40×59	14. 60×73	20. 70×30
9. 30×93	15. 50×96	21. 90×60

MULTIPLYING BY A TWO-FIGURED NUMBER

1. Frank and Ralph sold tickets for an entertainment. They sold them at 35¢ each. Frank sold 30 and Ralph sold 9.

How much did Frank get for his tickets?
How much did Ralph get?
How much did both get?
How many tickets did both sell?
Then how much did they get for 39 tickets?

2. Would you like to know a short way to find how much the boys got for 39 tickets at 35¢ each?

\$.35	This is the way:
39	*First multiply \$.35 by 9.*
315	*Then multiply \$.35 by 3. But write the 5 of*
105	*3 × 5 under the 3 by which you were multi-*
\$13.65	*plying. Add as if the 105 were 1050.*

3. There are 24 rooms in the building where Alice goes to school. See if you can find how many writing pads it will take if 38 are sent to each room.

38	
24	*Remember that you first multiply by 4.*
152	*Then multiply by 2 and write the 6 of 16 under*
76	*the 2 by which you multiplied.*
912	

4. Frank earned \$0.65 a day on a paper route. At this rate, how much can he earn in 24 days?

CHECKING MULTIPLICATION

1. Multiply 216 by 34 and check the result.

Work		Check
216	*Notice that when 4 was multi-*	34
34	*plied by 2 in the "check," the prod-*	216
864	*uct (8) was written directly below*	204
648	*the 2 that was used as multiplier.*	34
7344		68
		7344

2. Multiply 428 by 45 and check your result by multiplying 45 by 428.

Find the products and check:

3.	4.	5.	6.	7.	8.
318	269	427	916	268	316
47	56	35	38	54	63
9.	**10.**	**11.**	**12.**	**13.**	**14.**
298	367	286	198	317	187
27	84	73	64	86	93
15.	**16.**	**17.**	**18.**	**19.**	**20.**
265	732	624	532	723	296
46	87	97	56	85	38

21. Multiply 208 by 36 and check.

208	36
36	208
1248	288
624	72
7488	7488

Where was the 2 of 12 written when you multiplied 6 by 2?

Find and check:

22.	23.	24.	25.	26.	27.
407	509	308	604	706	509
56	47	63	83	96	87

DRILL IN LONG MULTIPLICATION

1.	2.	3.	4.	5.	6.
214	325	413	345	416	536
23	32	42	34	43	22
7.	**8.**	**9.**	**10.**	**11.**	**12.**
324	256	346	521	467	642
45	64	72	28	39	48
13.	**14.**	**15.**	**16.**	**17.**	**18.**
460	570	480	630	760	540
34	37	56	49	38	65
19.	**20.**	**21.**	**22.**	**23.**	**24.**
506	702	609	508	603	209
54	48	67	39	27	75

PROBLEMS TO SOLVE

1. For Thanksgiving dinner Helen's mother bought a turkey that weighed 14 pounds. It cost 48¢ a pound. How much did the turkey cost?

2. Fred kept 18 hens last spring and summer. But in the fall he sold them at $2.15 apiece. How much did he get for them?

3. The Girls' Club had a candy sale. They sold 48 bags of candy at 15¢ a bag, and 26 bags at 25¢ a bag. How much did they get for all?

4. A boy sold 65 copies of *The Saturday Evening Post* each week. Can you tell how many he sold in a year if he sold this number each week? (There are 52 weeks in a year.)

5. Fred sold 16 baskets of tomatoes at $0.85 a basket. How much did he get for them?

6. Helen's brother works in a store for $35 a week. How much is that for a year?

7. Ralph bought 18 hens at $0.95 each and sold them at $1.40 each. If the eggs he got paid for the feed, how much did he make?

8. When desks cost $4.85 each, how much will it cost for a classroom of 36 desks?

9. Frank's father picked 85 boxes of apples and sold them at $1.75 a box. How much did he get for them?

SELLING A PART OF A POUND: REVIEW

There are 16 ounces in a pound.

1. How many ounces in $\frac{1}{2}$ lb.? In $\frac{1}{4}$ lb.? In $\frac{1}{8}$ lb.?

2. How many ounces in $\frac{3}{4}$ lb.? In $\frac{3}{8}$ lb.? In $\frac{5}{8}$ lb.? In $\frac{7}{8}$ lb.?

3. *Fill blanks and learn:*

8 oz. = —— lb.	6 oz. = —— lb.
4 oz. = —— lb.	10 oz. = —— lb.
2 oz. = —— lb.	12 oz. = —— lb.
1 oz. = —— lb.	14 oz. = —— lb.
3 oz. = —— lb.	5 oz. = —— lb.

4. When butter is 48¢ a pound, how much is 8 oz. worth?

5. When peanut brittle is 40¢ a pound, how much is 4 oz. worth?

6. When mixed candy is 48¢ a pound, how much is 8 oz. worth?

7. What should be charged for 8 oz. of candy worth 20¢ a pound?

8. What should be charged for 8 oz. of chocolate candy worth 80¢ a pound?

9. If you ask for 20¢ worth of 40¢ candy, how many ounces should the clerk give you?

10. If you buy a 10¢ package of candy selling at 40¢ a pound, how many ounces should you get?

11. If candy is 60¢ a pound, how many ounces should be sold for 15¢? For 30¢? For 45¢?

MEASURING LENGTH: REVIEW

1. With your ruler measure the length of your blackboard. How many feet long is it?

2. Draw a straight line on the blackboard and "guess" how long it is. Measure it and see how nearly correct you were.

3. How many inches long do you think your book is? Measure and see how nearly correct you were.

4. How many feet long do you think your room is? Measure and see how nearly correct you were.

5. How many yards long do you think the hall of your school is? Measure and see how nearly correct you were.

6. Long distances are measured in miles. Do you know some place a mile away? 5 miles away? 10 miles away?

1 mile = 5280 feet = 1760 yards.

7. How many feet of woven wire fencing is needed for a field $\frac{1}{4}$ of a mile around?

8. How many yards of such fencing are needed for a field $\frac{1}{8}$ of a mile around?

9. How many feet of telephone wire is needed for a line between two towns 8 miles apart?

10. In a city where there are 8 blocks to the mile, how many feet long is each block?

11. If your steps average 2 feet long, how many steps will you take in walking a mile?

A REVIEW OF LIQUID MEASURE

1. How many pints in a quart? In a gallon?

2. When maple sirup is $2.40 a gallon, how much a quart is that? How much a pint?

3. When milk is 14¢ a quart, how much a gallon is that? How much a pint?

4. George made a gallon of lemonade and sold it at 5¢ a glass. There are two glasses in a pint. How much did he get for it?

5. Mary is going to have a party. There are to be 24 children there. If she allows a pint of lemonade for each, how many gallons will she need?

6. If a quart of ice cream will serve 8 people, how many will a gallon serve?

7. Helen wants to make 5 gallons of lemonade for a picnic party. She does not have a gallon measure, and has to measure it out with a pint cup. How many pints must she take?

8. On Fourth of July, George and Harry are going to sell lemonade. If they make 5 gallons and sell it all at 5¢ a glass, how much money will they get for it? (A glass = $\frac{1}{2}$ pint.)

Give the missing numbers:

9. 5 gal. = —— qt.
10. 24 qt. = —— gal.
11. 7 qt. = —— pt.
12. 18 pt. = —— qt.
13. 1 qt. = —— half-pints (glasses).
14. 3 qt. = —— half-pints.

REVIEWING QUARTS, PECKS, AND BUSHELS

1. How many quarts in a peck? In a bushel?

2. How many pecks in 2 bushels?

3. Charles feeds his rabbits a quart of oats each day. How long will a bushel last?

4. Frank put a bushel of pears in 2-quart baskets and sold them at 20¢ a basket. How much did he get for them?

5. John gathered a bushel of plums which he sold at 9¢ a quart. How much did he get for them?

6. One day James and Frank picked 2 gallons of wild blackberries which they sold at 8¢ a pint. How much did they get for them?

7. When potatoes were $1.40 a bushel, Helen's mother was paying 40¢ a peck. How much could she have saved on each bushel by buying by the bushel?

8. When apples were selling for $2.50 a bushel, Mrs. Hanna was paying 80¢ for 8-quart baskets. How much could she save on a bushel by buying them by the bushel?

9. When a 16-quart basket of potatoes is selling for $1.15, how much is that a bushel?

10. Walter gives his chickens 2 quarts of ground feed a day. How long will $\frac{1}{2}$ bushel last?

REVIEW OF MEASURES OF WEIGHT

1. Mary asked for $\frac{1}{2}$ lb. of candy. How many ounces should she get?

2. Six children have 3 lb. of candy which they wish to divide equally. How many ounces should each get?

3. Nell paid 20¢ for a bag of candy weighing 4 ounces. How much a pound was that?

4. At a candy sale the candy was put up in bags holding 2 oz. If it is sold for 5¢ a bag, how much a pound is that?

5. When pound boxes of candy are selling for 60¢, a 4-oz. bag of the same kind of candy should cost how much?

6. Do you know of anything that is sold by the ton?

16 ounces = 1 pound.
2000 pounds = 1 ton.

7. Frank's father bought 3 tons of coal. How many pounds is that?

8. How many pounds in $\frac{1}{2}$ ton of coal? In $\frac{1}{4}$ ton?

9. To think how heavy a ton is, think how many children each weighing 100 pounds it would take to weigh a ton.

10. *Fill the blanks:*

$\frac{1}{2}$ ton = —— lb.
$\frac{1}{4}$ ton = —— lb.
$\frac{1}{5}$ ton = —— lb.
$\frac{1}{8}$ ton = —— lb.

$\frac{1}{2}$ lb. = —— oz.
$\frac{1}{4}$ lb. = —— oz.
2 oz. = —— lb.
4 oz. = —— lb.

REVIEW OF MEASURES OF TIME

1. How many days in a week? In 4 weeks? In 12 weeks?

2. How many weeks in 28 days? In 56 days? In 63 days?

3. How many weeks in a year? How many months? How many days?

4. Name the months in a year. Which month has just 4 weeks?

5. Write down the months that have just 2 days more than 4 weeks (30 days).

6. Write down the months that have 3 days more than 4 weeks (31 days).

7. If you have 9 weeks of summer weather, how many days is that?

8. If John sells an average of 35 papers each day, how many will he sell in February? In March?

9. How many seconds in a minute? In 5 minutes? In $\frac{1}{2}$ minute? In $\frac{1}{4}$ minute?

10. How many minutes in an hour? In $\frac{1}{4}$ hour? In $\frac{1}{2}$ hour?

11. How many hours in a day? In $\frac{1}{2}$ day? In $\frac{1}{3}$ day?

12. If there are 180 school days in a year, how many other days are there?

13. If you have 38 weeks of school each year, how many weeks of vacation are there?

14. Walter planted peas on April 3 and gathered the peas on June 6. Find how many days from planting until the peas were gathered.

15. An early bean will bear beans ready for use in about 63 days from the day of planting. If planted on April 15, when should you expect beans ready for use?

Fill the blanks:

16. 18 da. = — wk., — da.

17. 26 da. = — wk., — da.

18. 45 da. = — wk., — da.

19. 80 min. = — hr., — min.

20. 100 min. = — hr., — min.

21. 3 wk., 2 da. = — da.

22. 5 wk., 3 da. = — da.

23. 1 yr., 10 mon. = — mon.

24. 2 yr., 3 mon. = — mon.

25. 5 yr., 6 mon. = — mon.

ROMAN NUMERALS

1. You have noticed that on some clocks letters were used to represent numbers. The chapters of some books are numbered the same way.

I II IV V IX X

are called **Roman numerals.**

1 2 4 5 9 10

are called **Hindu numerals.**

2. There are but seven letters used in the Roman numerals. They are

I	V	X	L	C	D	M
1	5	10	50	100	500	1000

3. Repeating a letter repeats its value.

II equals 1 + 1, or 2. III equals 1 + 1 + 1, or 3.
XX equals 10 + 10, or 20.
XXX equals 10 + 10 + 10, or 30.
CC equals 100 + 100, or 200.
CCC equals 100 + 100 + 100, or 300.

4. When two letters are written, if the letter of larger value is written first, the values of the two are added.

VI equals 5 + 1, or 6
XI equals 10 + 1, or 11
CX equals 100 + 10, or 110
VIII means 5 + 3, or 8
XVI means 10 + 6, or 16
CXX means 100 + 20, or 120

5. When a letter of smaller value comes first, it is subtracted.

IV equals 5 − 1, or 4
IX equals 10 − 1, or 9

Tell what these equal:

6. VII XIII XXV XIV

7. XIV XIX XL XC CD

8. XLIV LXVI XLIII

TEST IN ADDITION

Do not copy the figures. Lay a sheet of paper below each set and write sums only.

You ought to add any 10 of these in 2 minutes.

3	4	6	2	7	8	5	6	8	3
9	3	5	9	2	3	7	4	3	6
6	9	4	3	5	9	2	1	3	5
7	5	8	6	6	2	6	8	4	1
8	3	7	8	5	1	4	7	5	6

6	5	3	9	4	7	8	1	3	6
7	2	4	1	9	6	3	8	5	7
5	6	8	4	3	2	2	5	9	6
3	2	5	4	6	5	4	7	2	8
5	3	4	2	1	6	5	2	6	5

7	3	6	9	2	1	3	8	6	5
9	6	4	2	8	9	5	6	3	7
2	5	7	5	4	6	3	2	9	6
4	6	7	8	5	3	9	6	3	5
4	3	8	6	9	5	2	3	8	9

5	7	6	3	9	8	5	4	3	6
4	6	3	9	7	8	6	5	7	3
6	2	8	2	4	6	7	9	5	3
8	4	2	6	3	2	9	5	8	9
6	7	8	3	5	9	1	2	3	6

You should be able to add any 7 in 3 minutes.

1.	2.	3.	4.	5.	6.
385	634	735	864	936	826
436	975	487	295	287	497
975	386	456	736	365	368
7.	**8.**	**9.**	**10.**	**11.**	**12.**
567	348	635	723	853	832
638	752	348	497	469	496
796	846	976	684	734	832

TESTS IN SUBTRACTION

You should be able to subtract any 5 in 2 minutes.

1.	2.	3.	4.	5.
3946	4603	8396	6780	6906
1327	2461	4783	2357	1752
6.	**7.**	**8.**	**9.**	**10.**
7538	4038	5613	6730	5164
2165	2314	1462	5316	3841
11.	**12.**	**13.**	**14.**	**15.**
6287	5602	5680	6037	9608
2556	1381	2437	4624	6534
16.	**17.**	**18.**	**19.**	**20.**
7341	6786	9375	9834	7268
5620	1395	3621	7922	5745

21.	22.	23.	24.	25.
8639	7468	8396	7825	9046
6372	4836	5945	3694	5826

26.	27.	28.	29.	30.
8350	7681	8168	9275	8306
3840	5268	3557	5763	1295

TESTS IN MULTIPLICATION

You should multiply any 5 in 2 minutes.

1.	2.	3.	4.	5.
4936	5847	6259	6308	5924
6	5	7	8	4

6.	7.	8.	9.	10.
5648	7392	8647	9532	8736
6	5	8	7	9

11.	12.	13.	14.	15.
7639	2847	5639	8726	9543
8	7	6	5	4

You should multiply any 5 in 3 minutes.

1.	2.	3.	4.	5.
96	84	75	68	49
37	47	63	45	82

6.	7.	8.	9.	10.
87	65	93	84	69
25	39	48	65	37

TESTS IN DIVISION

Test I

You should give these in 30 seconds.

9)81	8)72	7)63	9)54	6)42	8)56	7)42	8)64
7)56	9)63	9)72	7)49	5)45	6)54	9)45	7)28
5)35	6)42	4)24	9)36	7)35	3)27	6)48	4)32

Test II

You should finish the 15 of either test in 10 minutes

1.	2.	3.	4.	5.
7)2422	7)3367	7)4123	7)4718	7)5859
6.	**7.**	**8.**	**9.**	**10.**
8)3096	8)3344	8)3488	8)3808	8)6872
11.	**12.**	**13.**	**14.**	**15.**
9)3276	9)4329	9)5382	9)5823	9)6642

Test III

1.	2.	3.	4.	5.
7)3400	6)3800	8)5400	9)5700	6)4300
6.	**7.**	**8.**	**9.**	**10.**
8)5100	7)3600	8)6300	9)7600	8)7900
11.	**12.**	**13.**	**14.**	**15.**
6)8300	7)8600	8)9700	6)9800	7)9400

Test IV

1.	2.	3.	4.	5.
6)4680	7)6510	8)6880	9)6660	7)4760
6.	**7.**	**8.**	**9.**	**10.**
6)5760	7)6090	8)4720	9)4320	8)5360
11.	**12.**	**13.**	**14.**	**15.**
9)7740	7)4830	9)7650	8)5840	7)6580

TESTS IN THE FOUR PROCESSES

Try but one test in one day. Do as many as you can of each test in 10 minutes. Check your answers to see how many were right. Score 1 for each right answer. At the end find the average for the four tests. Do not copy the exercises.

Test I

1. (Add)	2. (Sub.)	3. (Mul.)	4. (Div.)	5. (Add)
467				139
849				260
365	3684	387		495
281	1938	9	8)3824	768

6. (Sub.)	7. (Mul.)	8. (Div.)	9. (Mul.)	10. (Div.)
4061	296		467	
2784	70	7)3836	80	9)3303

Test II

1. (Add)	2. (Sub.)	3. (Mul.)	4. (Div.)	5. (Add)
534				269
297				578
685	5074	296		314
279	2349	80	8)3176	2262

6. (Sub.)	7. (Mul.)	8. (Div.)	9. (Mul.)	10. (Div.)
3091	739		628	
1678	7	6)5082	60	7)3423

Test III

1. (Add)	2. (Sub.)	3. (Mul.)	4. (Div.)	5. (Add)
726				630
490				249
378	5026	368		376
496	1394	90	9)4752	586

6. (Sub.)	7. (Mul.)	8. (Div.)	9. (Mul.)	10. (Div.)
6402	429		538	
1396	7	8)4864	60	9)6624

Test IV (Time, 5 min.)

1. (Add)	2. (Sub.)	3. (Mul.)	4. (Div.)	5. (Add)
904				735
378				294
247	7310	913		369
476	5247	80	6)3768	487

A TEST IN PROBLEM SOLVING

See if you can solve all without help.

1. Helen paid \$2.28 for 6 yd. of dress goods. How much a yard did it cost?

2. Frank sold 24 qt. of strawberries at 18¢ a quart. How much did he get for them?

3. Mary bought $2\frac{1}{2}$ lb. of butter for her mother at 48¢ per pound. How much did it cost?

4. Billie's father drove 234 miles in 9 hours. How many miles per hour did he average?

5. Ralph had 72 hens, sold 15 of them, and bought 36 more. How many had he then?

6. On a 436-mile trip Fred went 105 miles by train, 128 miles by boat, and the rest by automobile. How long was the automobile trip?

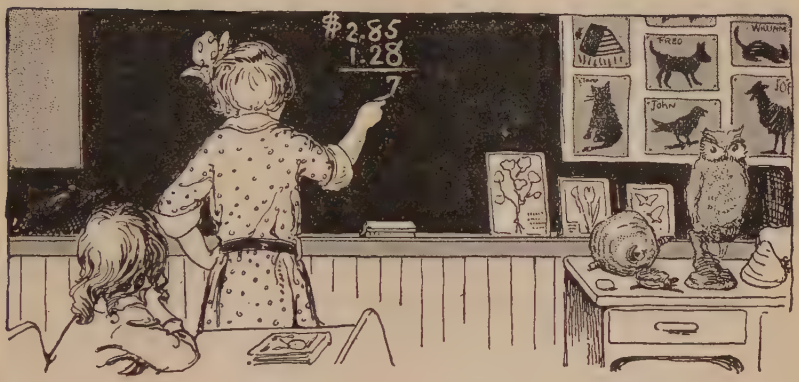
7. One day Jack picked 36 qt. of raspberries for Mrs. Harris and got $\frac{1}{3}$ of them for picking. He sold his share for 16¢ a quart. How much did he make?

8. Walter had a lemonade stand and sold 65 glasses one day at 5¢ a glass. The material cost him \$1.35. How much did he make?

9. Frank made up a hundred bags of popcorn to sell on circus day. They cost him \$1.75. How many bags at 5¢ a bag must he sell before there is any profit?

10. Donald paid \$29.60 for a bicycle. After using it 4 months he said, "I'll take $\frac{1}{4}$ less than cost for it." For how much would he sell it?

PLAYING TAG THE LEADER



One pupil, chosen as the leader, goes to the blackboard. The others all have paper and pencil. The leader makes up a problem and solves it on the blackboard. The others try to get the answer before the leader does. If any one gets the answer before the leader gives it, he calls out "Tag."

When Mary was leader, she said, "I want $2.85 to buy a doll that I saw down town. I now have $1.28. How much more do I need?"

When Charles was leader, he said, "Not counting Sundays there are 14 more days before Christmas. If I can earn 35¢ each day, how much can I earn before Christmas?"

Before playing the game, each pupil thought out a good problem to ask when he became leader.

TELLING WHAT ONE THING COSTS

1. If you get 2 small marbles for a cent, what is the cost of 1?

2. When you get 3 caramels for 1¢, what is the cost of 1?

3. At 5 for a cent, what is the cost of 1?

4. When candy is marked "4 for 1¢," what is the cost of 1 piece?

5. Tell the cost of 1 at 2 for 5¢; 3 for 10¢; 6 for 25¢.

6. What will 1 cost when you can get 3 for 5¢? 4 for 5¢?

7. *Tell the cost of 1 when you get:*

2 for 1¢	2 for 5¢	3 for 10¢
3 for 1¢	3 for 5¢	4 for 10¢
4 for 1¢	4 for 5¢	6 for 10¢
5 for 1¢	5 for 5¢	8 for 10¢

8. *Tell what 1 costs when you get:*

2 for 25¢	3 for 50¢	3 for $1.00
3 for 25¢	4 for 50¢	4 for $1.00
4 for 25¢	6 for 50¢	6 for $1.00
6 for 25¢	8 for 50¢	8 for $1.00

9. At 3 for 1¢, how many marbles can you get for 5¢?

10. At 2 for 5¢, how many apples can you get for 10¢?

11. At 3 for 10¢, how many plums can you get for 20¢?

12. When jacks are 4 for 5¢, how many can you buy for 15¢?

13. When caramels are 3 for 5¢, how many can you get for 15¢?

14. At 5 marbles for a cent, how many can you buy for a nickel?

EXERCISES IN ADDITION

Use these exercises very frequently. In adding and checking you will review all of the primary combinations of addition.

Add and check:

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
8	6	2	6	2	8	6	5	9	9
1	2	1	3	4	8	6	2	7	9
5	3	3	4	3	9	4	6	6	5
7	4	3	3	3	6	4	5	7	3
2	3	8	2	8	7	7	7	9	7
8	2	2	2	2	9	1	5	4	7

See how quickly you can add and check these:

1.	2.	3.	4.	5.	6.
286	467	786	128	568	697
487	848	529	948	759	687
592	756	694	953	786	879
365	634	779	654	379	798

REVIEW OF WRITTEN ADDITION

Lay a sheet of paper below and write the sums. Then check by adding in the opposite direction.

You should add any six of these in 3 minutes. If you cannot, return to them every day or so until you can.

Add and check:

1.	2.	3.	4.	5.	6.
264	915	982	583	881	456
732	643	744	345	509	942
427	806	712	521	791	316
189	571	936	851	224	668

7.	8.	9.	10.	11.	12.
751	827	671	391	336	927
996	245	288	814	513	159
381	633	436	527	864	481
576	496	692	742	691	772

13.	14.	15.	16.	17.	18.
459	581	521	788	721	533
234	928	693	564	357	471
662	871	137	243	895	834
745	316	856	971	619	862

Write in columns and add:

19. 281 + 498 + 539 + 546 + 728.
20. 685 + 597 + 867 + 793 + 245.
21. 976 + 786 + 798 + 987 + 234.

PROBLEMS WITHOUT NUMBER

1. If you know the cost of one article and the amount you have to spend, how can you find how many you can buy?

2. If you know the number of like things bought, and the price paid for all, how can you find the cost of one?

3. If you know the cost of one thing, how can you find the cost of any number of the same thing?

4. If you know your weight and that of some one else, how can you find how much more one weighs than the other?

5. If you buy two articles, how can you find how much both cost?

6. How can you find how much more one costs than the other?

7. If you know how much Ralph got for his flock of hens, how can you find the average amount he got for each?

8. When you know what Mr. Brown pays per month for rent, how can you tell how much he pays per year?

9. When you know his yearly salary, how can you find how much he gets per month?

10. If you know how far a man drives his car in 5 hours, how can you find the average rate that he drives per hour?

11. If you know how many pages of a book you can read per hour, how can you find how many pages you can read in 5 hours?

12. If you know your age and your father's age, how can you find how much older he is?

13. How can you find how long it will take you to save a certain sum when you know how much you can save per day?

14. If you are saving to buy something and have saved part of it, how can you tell how much more you must save?

15. When you know the cost of a dozen oranges, how can you find the cost of half a dozen? The cost of 3 dozen?

MAKING PROBLEMS

Make the problem that you would ask if you were the person named. Then solve it.

1. Frank wants to save enough in 8 weeks to buy a coaster costing $6.

2. Helen has $1.75 and wants to buy a desk costing $3.98.

3. Jack made $2.65 a week on a paper route for 9 weeks.

4. Billie has $5. He wants to buy a tool set costing $3.85 and a pair of skates costing $1.75.

5. Frank was going with his father on a 350-mile automobile trip. They traveled 238 miles the first day.

SUBTRACTION FACTS

Practice daily on these until you can give them all in 2 minutes.

5	4	3	5	6	5	4	5	2
3	2	1	1	3	4	1	2	1
3	4	7	6	7	8	6	7	8
2	3	1	2	5	2	5	3	4
7	8	6	7	6	7	8	9	8
4	1	4	2	1	6	3	1	7
8	9	8	9	9	9	9	9	9
5	7	6	4	5	2	3	6	8
10	11	13	11	10	10	11	12	10
1	7	8	5	9	5	3	3	3
11	11	13	12	10	11	14	12	14
9	6	5	8	8	4	7	6	9
10	11	12	11	13	10	16	10	16
6	2	4	8	4	2	7	4	8
14	13	12	17	16	10	15	12	15
6	7	9	8	9	7	8	7	6
12	18	15	14	13	14	17	13	15
5	9	7	8	6	5	9	9	9

EXERCISES IN SUBTRACTION

You should subtract any six of these in 2 minutes. If you cannot, return to them every day or so and practice until you can.

Subtract and check:

1.	2.	3.	4.	5.	6.
9306	8714	6938	7251	8290	7365
1821	3482	2697	5836	5478	3624
7.	**8.**	**9.**	**10.**	**11.**	**12.**
5139	6457	8436	7984	6375	9684
2765	3964	4918	5693	4768	6927
13.	**14.**	**15.**	**16.**	**17.**	**18.**
6198	7056	8139	7648	9237	8641
4569	5639	4751	4685	7928	4708
19.	**20.**	**21.**	**22.**	**23.**	**24.**
9547	4876	5197	8036	9130	8706
4397	1695	3848	5621	7428	5692
25.	**26.**	**27.**	**28.**	**29.**	**30.**
7039	8426	9371	8006	4957	8739
5462	3843	5765	5342	2768	4957
31.	**32.**	**33.**	**34.**	**35.**	**36.**
6134	7864	6731	8013	7306	8147
2891	1892	2927	6809	4863	2669

See if you can subtract all on this page in 12 minutes. Then check and see how many were correct.

EARNING AND SPENDING MONEY

1. Frank wants a coaster. He saw one costing $5.48 and another costing $8.25. How much more does the better one cost?

2. If Frank has $7.40, how much more does he need in order to buy the better coaster?

3. If he buys the cheaper coaster, how much will he have left?

4. Helen went shopping with $2.30. When she returned, she had $0.76 left. How much had she spent?

5. Dorothy has saved up $2.38. If she buys her little brother a train of cars costing $1.35, how much will she have left?

6. Walter has $3.40 in his bank. If he buys a Gilbert Erector costing $2.19, how much will he have left?

7. Frank is saving to buy a tool chest costing $3.50. He has $1.98. How much more does he need?

8. Ralph wants a Home Toymaker. One set costs $3.50 and the other $2.98. How much can he save by taking the cheaper set?

9. Mary's mother bought her a doll and doll's trunk for Christmas. The doll cost $2.18 and the trunk cost $0.98. How much did both cost?

10. Frank is saving for two things: a jig saw costing $3.75 and a Meccano set costing $4.39. How much will he have to save for both?

11. James saw a small Meccano set costing $2.69. He has $1.85 in his bank. How much more does he need to buy it?

12. Ralph gets 8¢ a package for delivering small packages. How many will he have to deliver to earn enough to buy an Erector set costing $3.60?

A SCHOOL PICNIC

1. The fourth grade of the Grant School planned for a picnic. They thought that they should allow 5 sandwiches for each. There are 20 girls and 12 boys in the class. How many sandwiches will be needed?

2. A committee was appointed to buy bread, butter, and ham and make the sandwiches. They were allowed $3.50. They thought they would need 8 large loaves of sandwich bread costing 20¢ a loaf; 2 pounds of boiled ham costing 70¢ a pound; and a pound of butter costing 47¢. Will they have enough money?

3. A committee was given $2 for cakes. They bought 3 at 65¢ each. How much money was left?

4. Another committee was allowed $2.75 for fruit. They got 4 doz. bananas at 30¢ a doz. and 3 doz. oranges at 50¢ a doz. How much money had they left?

5. The party took 2 doz. lemons costing 30¢ a dozen and 5 lb. of sugar costing 8¢ a pound to make lemonade. How much did the lemonade cost?

6. Each pupil brought 30¢ to pay toward the cost. How much money did they have left?

A REVIEW OF MULTIPLICATION

Find the products, then go over your work a second time to be sure that it is correct.

You should do any seven of the following in 4 minutes. If you cannot, return to them very frequently and practice until you can.

Multiply and check:

1.	2.	3.	4.	5.	6.	7.
78	96	85	94	56	74	93
45	37	46	57	82	91	63

8.	9.	10.	11.	12.	13.	14.
82	39	72	84	56	97	86
58	56	87	95	76	48	73

15.	16.	17.	18.	19.	20.	21.
79	48	49	58	67	74	85
92	67	72	86	43	57	68

PROBLEMS IN MULTIPLICATION AND DIVISION

1. Mary found that the cost of a Thanksgiving dinner was $6.45 for their family of five persons. What was the average cost for each?

2. Frank found that their Thanksgiving dinner cost an average of $1.09 for each in their family of seven persons. Find the cost of the dinner.

3. A fourth-grade class is going to give a party to the third grade. If each of the class of 36 brings 15¢ for the refreshments, how much will they have?

4. To allow 4 pieces of fudge for each person at the party, how many pieces must they have? (There are 36 from the fourth grade and 38 from the third.)

5. How many doughnuts at 3¢ each can they buy for $2.40?

6. Sixteen of the boys offered to bring 6 apples each. Will that allow an apple for each of the 74 persons at the party? How many more than one for each will there be?

7. Helen's mother bought a 4-yard remnant of cloth for $2.78. From the regular stock she would have paid $0.85 a yard. How much did she save?

8. Henry's flock of hens cost him $1.85 a week for feed. In 8 weeks he sold $26.50 worth of eggs. That was how much more than the feed cost?

9. Walter had 9 hens for which he was offered $15. He asks $1.85 apiece for them. He was offered how much less than he asks for the flock?

10. A man bought apples at $2.75 a box of 96 apples and sold them at 5¢ each. How much did he make on each box?

11. Henry took subscriptions for a magazine at $1.50 each. He got 8 subscribers and was paid $\frac{1}{3}$ of the money for his work. How much did he earn?

12. It will take 5 yards of cloth at 95¢ a yard or 4 yards of a wider kind at $1.15 a yard to make a dress. Which is cheaper and how much?

JACK'S VISIT TO THE COUNTRY

1. Jack wanted to visit his uncle who lived in the country. Jack's father told him that if he would earn half of the money needed for the trip, he would give him the rest. Jack found that the fare each way would be \$7.48, and that he needed \$10 for other things for the trip. How much did Jack have to earn?

2. Jack's uncle learned that he was trying to earn money, so he shipped him a 12-dozen crate of eggs each week to sell. The eggs cost Jack \$4.50 a crate. He sold the eggs for 50¢ a dozen. How much did he make on each crate?

3. Jack earned enough in 4 weeks to pay his half of the trip. How much did he average each week?

4. While with his uncle he earned money by selling vegetables to people passing. He sold \$158 worth during the summer and got $\frac{1}{4}$ of it. How much did he earn?

5. Jack was selling produce for his uncle 5 weeks. How much did his earnings average per week?

6. When Jack got home, he decided to work up a regular business in eggs from his uncle's farm. If he can secure customers for a 30-dozen crate per week and make 12¢ on each dozen, how much is that per week?

7. Do you know of boys or girls earning money? If so, can you make some good problems for the class?

ZEROS IN THE MULTIPLIER

1. Multiply 687 by 405.

Work	Check
687	405
405	687
3435	2835
2748	3240
278235	2430
	278235

Another way to check multiplication is to perform the work a second time without interchanging the multiplier and multiplicand.

Multiply and check by either method:

2.	3.	4.	5.	6.	7.
369	278	549	638	574	298
504	607	308	507	209	809

8.	9.	10.	11.	12.	13.
925	846	754	683	739	964
706	508	409	603	507	809
14.	**15.**	**16.**	**17.**	**18.**	**19.**
736	485	692	578	439	765
840	730	950	650	870	490
20.	**21.**	**22.**	**23.**	**24.**	**25.**
943	854	769	658	729	863
820	910	730	690	580	670
26.	**27.**	**28.**	**29.**	**30.**	**31.**
460	570	860	930	780	820
920	860	740	690	810	570

PRACTICE IN DIVISION

1. *Give the missing number:*

I	II	III	IV
$? \times 3 = 9$	$? \times 5 = 20$	$? \times 7 = 35$	$? \times 6 = 54$
$? \times 4 = 16$	$? \times 4 = 12$	$? \times 5 = 40$	$? \times 4 = 28$
$? \times 7 = 42$	$? \times 9 = 63$	$? \times 8 = 24$	$? \times 7 = 21$
$? \times 6 = 30$	$? \times 8 = 72$	$? \times 9 = 45$	$? \times 8 = 64$
$? \times 8 = 32$	$? \times 3 = 18$	$? \times 4 = 24$	$? \times 6 = 36$
$? \times 7 = 49$	$? \times 8 = 48$	$? \times 9 = 81$	$? \times 9 = 36$
$? \times 9 = 27$	$? \times 3 = 15$	$? \times 8 = 56$	$? \times 5 = 25$

2. The first question in column I is, "How many 3's make 9?" So these are really division questions.

To know the division facts you must first know the multiplication facts.

3. As division questions, column I, are

3)9 4)16 7)42 6)30 8)32 7)49 9)27

Give the answers.

4. Write column II as division, and write the answers.

5. Write columns III and IV as division, and write the answers.

Divide:

6. 3)285	11. 5)1735	16. 8)3736
7. 4)756	12. 6)1542	17. 9)2475
8. 5)865	13. 7)2681	18. 9)3528
9. 4)936	14. 5)1760	19. 8)3456
10. 3)735	15. 6)2394	20. 9)4275

CHECKING WORK IN DIVISION

1. Divide 382 by 9 and prove that your answer is correct.

9)382
42, 4 rem.
× 9
378
+ 4
382

The quotient shows that 382 is 4 more than 9 × 42. To see if this is right, find 9 × 42 + 4.

The division and the check may be written down as shown here.

Divide and check:

2.	3.	4.	5.	6.
8)594	7)687	9)843	9)628	5)864
7.	**8.**	**9.**	**10.**	**11.**
8)786	7)943	6)698	6)1348	9)1765
12.	**13.**	**14.**	**15.**	**16.**
7)3146	8)1898	7)1536	8)2765	9)3426

17. John paid $18.40 for 8 hens. How much was that for each?

18. Helen is making candy for a "Candy Sale." She has 228 pieces of fudge that she wants to put in bags of 6 pieces each. How many bags will she need?

19. Nell is going to put 8 small pieces of fudge in each bag. How many bags will she need for 336 pieces?

EARNING MONEY

1. Grace made 156 pieces of fudge which she put up in bags of 6 pieces each and sold for 5¢ a bag. How much did she get for all of it?

2. Fred paid $18.55 for 7 hens. Later he was offered $3.15 each for them. At that price, how much would he have made on each hen?

3. Mary bought enough cloth for 72¢ to make 8 broom bags. She sold them at a "Fair" for 25¢ each. How much did she make on each? On all?

4. Charles made 7 kites and sold them at 65¢ each. The material cost him $1.26 for all. How much did he make on each kite? On all?

5. Frank gathered 2 gallons of wild blackberries which he put in quart boxes and sold for 18¢ a quart. How much did he get for them?

6. Walter gathered 3 gallons of wild huckleberries which he sold in pint boxes at 9¢ a box. How much did he get for them?

7. Henry bought a jig saw for $3.15 and makes wooden toys. He makes 9¢ on each toy. How many will he have to sell to pay for his saw?

8. Frank bought 100 Christmas cards for $2.75 and sold them at 5¢ each. How much did he make?

A TEST IN SOLVING PROBLEMS

See how many you can solve in 15 minutes. Use a pencil only when necessary.

1. John earned 15¢ one day and 20¢ the next. He spent all but 8¢ of it. How much did he spend?

2. Helen got 9¢ a day for 2 weeks for drying the dinner dishes. How much did she earn?

3. At 25¢ a yard, how many yards of ribbon can be bought for $2?

4. If a boy rides his bicycle 24 miles in 4 hours, what does he average per hour?

5. If a man drives an average of 24 miles an hour, how far can he go in 4 hours?

6. The suits for our baseball nine cost $4.25 for each player. Find the cost of all.

7. When 3 pounds of candy are put up into 8-ounce packages, how many packages will there be?

8. When 2 yards of ribbon are cut into 9-inch pieces, how many pieces will there be?

9. When 3 gallons of maple sirup are put up in quart jars, how many jars will there be?

10. Frank is 5 years old and his brother is 10. How old will Frank be when his brother is 15?

11. Mrs. Brown's baby is $1\frac{1}{2}$ years old. Mrs. Smith's baby is 15 months old. Which baby is older and how many months?

12. If John gets 8¢ each for delivering packages, how many will he have to deliver to earn $2?

13. In 12 years, Helen will be 20 years old. How old is she now?

14. Four yards of ribbon will make how many 8-inch badges?

15. When a 4-pound hen sold for $1.60, how much a pound was that?

16. When 3 marbles can be bought for 5¢, how many can you buy for 25¢?

17. When candy is 60¢ a pound, how much should you pay for 4 ounces?

DIVIDING BY 10 OR 100

1. If 20¢ are divided equally among 10 children, how much will each receive?

2. If 30¢ are divided equally among 10 children, how much will each receive?

3. If 40 pieces of candy are divided equally among 10 children, how many pieces will each receive?

Give the quotients:

4.	5.	6.	7.
10)50	100)200	10)150	100)1200
10)60	100)300	10)250	100)1700
10)70	100)400	10)350	100)2500

From these, you see that

To divide a whole number ending in 0 by 10, cut off the right-hand 0 from the dividend and the part left is the quotient.

NOTE TO TEACHER. — Be sure that the pupil sees that the rule does not apply to dollars and cents.

8. Make a rule for dividing a number ending in 00 by 100.

Give the quotient:

9.	10.	11.
1750 ÷ 10 =	3800 ÷ 100 =	60,000 ÷ 100 =
2600 ÷ 100 =	3800 ÷ 10 =	60,000 ÷ 10 =
2600 ÷ 10 =	17,300 ÷ 100 =	38,000 ÷ 100 =
3560 ÷ 10 =	17,300 ÷ 10 =	38,000 ÷ 10 =

DOLLARS AND CENTS MULTIPLIED AND DIVIDED BY 10

1. George sold 10 baskets of apples at \$1.25 a basket. How much did he get for them?

\$ 1.25
10
\$12.50

You can see that this could have been found by annexing 0 and moving the decimal point one place to the right.

Tell, without a pencil, the product:

2. $10 \times \$2.35$
3. $10 \times \$1.85$
4. $10 \times \$3.15$
5. $10 \times \$1.20$
6. $10 \times \$2.40$
7. $10 \times \$3.50$
8. $10 \times \$5.25$
9. $10 \times \$6.10$
10. $10 \times \$3.00$

11. Frank sold 10 hens for \$21.50. How much was this for each?

10)2150¢
215¢
or, \$2.15

You know that \$21.50 = 2150¢.
You know that 2150¢ ÷ 10 = 215¢.
You know that 215¢ = \$2.15.
So you can see that this could have been found by cutting off 0 and moving the decimal point one place to the left.

Tell, without a pencil, the quotient:

12. 10)\$15.20
13. 10)\$75.30
14. 10)\$21.60
15. 10)\$3.50
16. 10)\$7.30
17. 10)\$5.40
18. 10)\$1.80
19. 10)\$2.40
20. 10)\$1.50

21. Fred sold 10 boxes of strawberries for $1.80. How much a box was that?

22. Frank sold 10 rabbits for $11.50. How much was that for each?

23. Nell made 10 aprons and sold them for $0.35 each. How much did she get for them?

24. Ralph sold 10 dozen eggs at $0.56 a dozen. How much did he get for them?

DIVIDING BY NUMBERS ENDING IN 0

1. Knowing that

30	40	50	60
4	7	4	3
120	280	200	180

write the quotient of:

30)120 40)280 50)200 60)180

From these, you see that

To divide a number ending in 0 by a number ending in 0, reject the 0 in the divisor and the right-hand 0 in the dividend.

2. *Give the quotients:*

A	*B*	*C*	*D*
20)80	30)180	40)160	50)350
20)120	30)240	40)320	50)450
20)180	30)150	40)280	50)250
20)160	30)270	40)360	50)200

E	*F*	*G*	*H*
60)240	70)560	80)320	90)450
60)360	70)630	80)560	90)360
60)480	70)490	80)720	90)810
60)540	70)350	80)640	90)720

3. There are 20 children going on a picnic. They have 60 sandwiches. How many will that allow for each?

4. They have 40 bananas. How many will that allow for each?

DIVIDING DOLLARS AND CENTS BY 20, 30, AND SO ON

1. John buys eggs by the crate (30 dozen) and sells them by the dozen. When he pays $12.60 a crate, how much is that a dozen?

$$30)1260¢$$
$$42¢$$

SHORT WAY

$$3Ø)\$1,2.6Ø$$
$$\$0.4\ 2$$

You know that $12.60 = 1260¢, and that 1260¢ ÷ 30 gives the same quotient as 126¢ ÷ 3. This is the same as $1.26 ÷ 3.

So you can see that "the short" way is to reject the 0 of the divisor and move the decimal point of the dividend one place to the left. Use a caret ^ for the new point.

2. Harry sold 20 hens for $42.60. How much was that for each?

2Ø)$4,2.6Ø $2.13	*This is the "short way" to find out. It gives the right answer, for 20 × $2.13 = $42.60.*

3. One Saturday 20 boys and girls went on a picnic. The total expense was $9.40. How much was that for each?

4. The expenses for a Hallowe'en party were $5.40. If 30 pupils contribute equally to pay them, how much will it cost each?

5. For a "Candy Sale" some girls bought a 20-pound bucket of mixed candy for $3.60. How much a pound did it cost? If they sell it for 35¢ a pound, how much will they make on each pound? On all?

Divide and check:

6. $3.60 ÷ 20
7. $5.70 ÷ 30
8. $6.40 ÷ 20
9. $9.60 ÷ 30
10. $13.20 ÷ 40
11. $13.50 ÷ 50
12. $11.20 ÷ 40
13. $9.80 ÷ 20
14. $10.50 ÷ 50
15. $17.20 ÷ 40
16. $21.60 ÷ 40
17. $36.50 ÷ 50
18. $19.20 ÷ 60
19. $25.20 ÷ 30

DIVIDING BY NUMBERS ENDING IN ZERO; ONE AND TWO FIGURED REMAINDERS

1. Since $20\overline{)40}$, $20\overline{)43}$
2 2, 3 remainder.

Give the quotient and remainders:

2.	3.	4.	5.
$20\overline{)84}$	$30\overline{)124}$	$40\overline{)83}$	$50\overline{)158}$
$20\overline{)63}$	$30\overline{)157}$	$40\overline{)129}$	$50\overline{)257}$
$20\overline{)126}$	$30\overline{)98}$	$40\overline{)165}$	$50\overline{)356}$

To divide a number by a number ending in 0, reject the 0 in the divisor and do not divide the right-hand number of the dividend. If there is no other remainder from dividing, the last number of the dividend is the remainder.

6. Since $20\overline{)60}$, $20\overline{)75}$
3 3, 15 remainder.

Give the quotients and remainders:

7.	8.	9.	10.
$20\overline{)96}$	$30\overline{)72}$	$40\overline{)92}$	$50\overline{)168}$
$20\overline{)134}$	$30\overline{)135}$	$40\overline{)145}$	$50\overline{)273}$
$20\overline{)156}$	$30\overline{)142}$	$40\overline{)175}$	$50\overline{)260}$

11. Make a rule for dividing by a number ending in 0, and tell how to get the remainder.

DIVIDING BY NUMBERS ENDING IN 0

To the Teacher. — The pupil must be led to see that the 0 of the divisor is rejected and the last number in the dividend is not divided; and that this number is *annexed* to the remainder from the division to get the whole remainder. Drill upon this until pupils can give quotients and remainders at sight, for it is imperative if long division is to be done with skill.

1. Divide 3468 by 50

50)3468 69, 18 rem.	*It is really 346 that is first divided. So place 6 under 6, and 9 under 8. The 1 remaining from 46 ÷ 5, with 8 annexed, gives 18 for the remainder.*

Find the quotients and remainders:

2.	3.	4.	5.	6.
40)9732	40)10753	30)8453	30)7687	40)13786
7.	**8.**	**9.**	**10.**	**11.**
50)1678	30)7630	40)9530	60)1370	60)9350
12.	**13.**	**14.**	**15.**	**16.**
60)17630	50)2761	40)1792	50)1765	60)2397
17.	**18.**	**19.**	**20.**	**21.**
60)4065	50)1987	70)3148	80)1926	90)3796

REMAINDERS IN DIVISION BY NUMBERS ENDING IN 0

1. Henry was offered \$41.75 for his flock of 20 hens. How much was that for each?

2Ø)\$4,1.75 \$ 2.08, 15¢ rem. or \$2.08$\frac{3}{4}$	*You have learned that when using 2 for the actual divisor instead of 20, the last number is not divided. So \$41.75 ÷ 20 = \$2.08 and 15¢ remaining. This remainder may be written $\frac{15}{20}$, which equals $\frac{3}{4}$, by dividing both numbers by 5.*

2. George bought a case (30 dozen) of eggs for \$11.55. How much did each dozen cost? ($\frac{15}{30} = \frac{1}{2}$. Why?)

3. The expenses of a class party were \$26.85. There are 40 in the class. If they share the expenses equally, how much must each pay?

4Ø)\$2,6.85 \$ .67, 5¢ rem.	*This cannot be answered by 67$\frac{1}{8}$¢, for no one can pay $\frac{1}{8}$ of a cent.* *Since 40 × \$.67 is but \$26.80, five will have to pay 68¢ each.*

4. If 20 boys go on a hike and the expense is \$27.45, how much must each pay if they share equally?

Divide, giving quotients and remainders:

5. 20)$37.45
6. 30)$19.65
7. 40)$17.83
8. 50)$26.35
9. 60)$19.48
10. 20)$43.54
11. 30)$46.38
12. 40)$86.75
13. 50)$76.84
14. 60)$78.45
15. 20)$37.75
16. 30)$46.45
17. 20)$19.68
18. 30)$17.65
19. 40)$32.50

FIRST LONG DIVISION

1. During the month of June Ralph got 1020 eggs from his flock of hens. That was an average of how many per day?

```
30)1020
   34
```

There are 30 days in June. So divide by 30.

2. During the month of July Ralph got but 806 eggs from the same flock. What was the average number per day?

```
   26
31)806
   62
  186
  186
```

July has 31 days, so the divisor is 31. With divisors like this, more of the work is written down. This is the way we do it. See if you can find how it was done.

3. Divide 966 by 21. This is the way it is done.

$$\begin{array}{r} 46 \\ 21\overline{)966} \\ \underline{84} \\ 126 \\ \underline{126} \end{array}$$

First we divide 96 by 21.

Look at 2 and 9 and think "9 ÷ 2 = 4, and 1 remaining."

Write 4 over 6 of 96, which is being divided.

Multiply 21 by 4 and write 84 under 96.

Subtract 84 from 96. The remainder is 12.

Annex 6, not divided, to 12, making 126 to divide.

Think, "12 ÷ 2 = 6." Write 6 over 6.

Find 6 × 21. Subtract the product from 126.

46 is right for 21 × 46 = 966.

The four steps in long division are:

1. Find the quotient figure and write it directly over the right-hand figure of the number divided.

2. Multiply the divisor by it.

3. Subtract the product from the number divided.

4. Annex the next figure, not divided, to the remainder.

Find the quotient and check by multiplication:

4.	**5.**	**6.**	**7.**	**8.**
$21\overline{)483}$	$31\overline{)744}$	$21\overline{)546}$	$31\overline{)558}$	$21\overline{)903}$
9.	**10.**	**11.**	**12.**	**13.**
$21\overline{)672}$	$41\overline{)656}$	$51\overline{)816}$	$41\overline{)984}$	$21\overline{)756}$
14.	**15.**	**16.**	**17.**	**18.**
$31\overline{)653}$	$31\overline{)992}$	$21\overline{)966}$	$41\overline{)738}$	$21\overline{)1323}$

19. $1054 \div 31 =$	**23.** $1066 \div 41 =$	**27.** $1071 \div 51 =$
20. $1312 \div 41 =$	**24.** $1116 \div 31 =$	**28.** $1953 \div 31 =$
21. $1554 \div 21 =$	**25.** $1764 \div 21 =$	**29.** $1395 \div 41 =$
22. $1302 \div 31 =$	**26.** $1435 \div 41 =$	**30.** $1785 \div 51 =$

ORAL DRILLS THAT PREPARE FOR LONG DIVISION

You will find it much easier to find the quotients in long division if you practice on these until you can give them all quickly.

Give quotients:

I	II	III	IV
20)60	30)270	50)400	70)280
20)80	30)210	50)300	70)350
20)100	30)240	50)450	70)560
20)120	40)160	60)180	70)490
20)140	40)240	60)300	80)240
20)160	40)320	60)420	80)400
20)180	40)360	60)240	80)480
30)90	40)280	60)480	90)270
30)120	50)150	60)540	90)540
30)180	50)350	70)210	90)360

Give quotients and remainders:

I	II	III	IV
20)45	30)63	40)87	50)107
20)63	30)75	40)96	50)126
20)87	30)92	40)125	50)154
20)106	30)102	40)137	50)178
20)128	30)125	40)165	50)207
20)163	30)136	40)172	50)236
20)187	30)157	40)206	50)259

SOME USES OF LONG DIVISION

1. If a train runs 798 miles in 21 hours, what is the average rate per hour?

2. Frank's father drove his car 336 miles on 21 gallons of gasoline. How many miles per gallon did he get?

3. Mary's mother said that their household expenses for the month of April were $119.66. How much did they average per day?

4. Last August Helen went with her parents for a vacation trip. During the month they drove 2418 miles. That was an average of how many miles per day?

5. Their expenses for the month amounted to $305.35. What was the average daily expense?

6. George had a patch of sweet corn. In all he sold 31 dozen ears and got $10.85 for it. What was the average price per dozen?

7. One month Frank sold 9 dozen eggs at 50¢ a dozen, 8 dozen at 45¢, and 4 dozen at 40¢. How many dozen did he sell? How much did he get for them?

ORAL DRILLS TO PREPARE FOR WRITTEN WORK IN LONG DIVISION

Frequent practice on this drill table will make you much more rapid in written work. See how quickly you can give them.

A	B	C	D	E
$21\overline{)42}$	$31\overline{)93}$	$41\overline{)123}$	$51\overline{)204}$	$61\overline{)183}$
$21\overline{)105}$	$31\overline{)62}$	$41\overline{)205}$	$51\overline{)306}$	$61\overline{)122}$
$21\overline{)189}$	$31\overline{)155}$	$41\overline{)164}$	$51\overline{)102}$	$61\overline{)305}$
$21\overline{)147}$	$31\overline{)124}$	$41\overline{)246}$	$51\overline{)357}$	$61\overline{)244}$
$21\overline{)126}$	$31\overline{)186}$	$41\overline{)369}$	$51\overline{)549}$	$61\overline{)549}$
$21\overline{)168}$	$31\overline{)217}$	$41\overline{)287}$	$51\overline{)153}$	$61\overline{)336}$
$21\overline{)63}$	$31\overline{)279}$	$41\overline{)328}$	$51\overline{)255}$	$61\overline{)488}$
$21\overline{)84}$	$31\overline{)248}$	$41\overline{)82}$	$51\overline{)408}$	$61\overline{)427}$

A RACE IN DIVISION

See how many you can divide in 5 minutes. Then check each. How many did you have right? Who won?

Divide and check:

1.	2.	3.	4.	5.
$41\overline{)2583}$	$41\overline{)3034}$	$41\overline{)2296}$	$41\overline{)3444}$	$41\overline{)3895}$
6.	**7.**	**8.**	**9.**	**10.**
$51\overline{)3315}$	$61\overline{)3477}$	$71\overline{)4402}$	$51\overline{)4386}$	$61\overline{)5856}$
11.	**12.**	**13.**	**14.**	**15.**
$51\overline{)3723}$	$61\overline{)4636}$	$51\overline{)4692}$	$61\overline{)2928}$	$71\overline{)5041}$
16.	**17.**	**18.**	**19.**	**20.**
$71\overline{)5964}$	$51\overline{)2958}$	$71\overline{)6816}$	$71\overline{)3763}$	$61\overline{)5063}$

Find the quotients and remainders:

21.	22.	23.	24.	25.
$21\overline{)916}$	$21\overline{)1105}$	$21\overline{)1547}$	$31\overline{)1620}$	$31\overline{)2010}$
26.	**27.**	**28.**	**29.**	**30.**
$21\overline{)1350}$	$21\overline{)1985}$	$31\overline{)2271}$	$31\overline{)2640}$	$31\overline{)2921}$
31.	**32.**	**33.**	**34.**	**35.**
$41\overline{)2591}$	$41\overline{)2300}$	$51\overline{)3480}$	$51\overline{)3725}$	$51\overline{)2970}$

You should drill on this page until you can divide at least 6 of them in 5 minutes. Some pupils can get 8 of these in 5 minutes after a few weeks' practice.

SECOND STEP IN LONG DIVISION

1. There are 36 pupils in the fourth grade of the Chestnut Street School. They want to buy a picture for their room that costs $16.20. If they share the cost equally, how much will each have to pay?

```
    $ .45
36)$16.20
   144
    180
    180
```

Since 16 ÷ 3 = 5 and 1 remaining, you may think that the quotient figure is 5. But 5 is too large for 5 × 36 = 180. So try 4.

To save writing down the wrong quotient figure, multiply mentally to see if the product is larger than the number divided. If so, take the next smaller number for the quotient figure.

NOTE TO THE TEACHER. — To save multiplying the whole divisor by the trial quotient was the object of the preceding drills. The method given above is the usual one, but the following method saves any mental work beyond the tables. Use the one that seems advisable.

2. Divide 2688 by 56.

```
  48
56)2688
  224
  448
  448
```

Think, "268 ÷ 50 = 5 and 18 rem." Think, "18 is less than 5 × 6." Try 4. In dividing 448, think, "448 ÷ 50 = 8 and 48 rem." Then think, "48 is 8 × 6. So 8 is right."

Find the quotients and check by multiplication:

3.	4.	5.	6.
$36\overline{)2988}$	$36\overline{)2268}$	$36\overline{)2664}$	$36\overline{)3456}$
7.	**8.**	**9.**	**10.**
$64\overline{)3392}$	$76\overline{)4332}$	$84\overline{)4536}$	$46\overline{)2622}$

11. $1104 \div 24$	**15.** $\$10.08 \div 36$	**19.** $\$13.77 \div 27$
12. $1512 \div 24$	**16.** $\$22.68 \div 84$	**20.** $\$12.32 \div 44$
13. $2128 \div 56$	**17.** $\$10.36 \div 37$	**21.** $\$15.66 \div 27$
14. $2968 \div 56$	**18.** $\$17.55 \div 45$	**22.** $\$36.00 \div 75$

ORAL DRILL IN LONG DIVISION

Since the only hard thing in long division is estimating the quotient figures, you need much drill in giving the quotients without doing the rest of the work.

NOTE TO THE TEACHER. — In using this drill, use the method selected for long division. That is, in finding $87 \div 26$ have the pupil think, "$8 \div 2 = 4$" and mentally see that 4×26 is larger than 87, or have him think, "7 remaining" and see that 7 is less than 4×6.

While the first method is the usual one, the second method requires less mental work.

Give the quotients, but not the remainders:

	A	B	C	D
1.	$24\overline{)189}$	$34\overline{)168}$	$43\overline{)386}$	$26\overline{)189}$
2.	$24\overline{)173}$	$42\overline{)296}$	$54\overline{)375}$	$37\overline{)176}$
3.	$32\overline{)156}$	$35\overline{)146}$	$65\overline{)446}$	$44\overline{)276}$

Give the quotients, but not the remainders:

4.	$32\overline{)162}$	$46\overline{)357}$	$83\overline{)578}$	$43\overline{)268}$
5.	$45\overline{)265}$	$84\overline{)428}$	$92\overline{)298}$	$64\overline{)392}$
6.	$56\overline{)375}$	$75\overline{)439}$	$76\overline{)475}$	$65\overline{)384}$
7.	$83\overline{)261}$	$36\overline{)195}$	$81\overline{)416}$	$54\overline{)316}$
8.	$74\overline{)297}$	$45\overline{)336}$	$74\overline{)365}$	$63\overline{)258}$

Practice very frequently on this set of exercises.

DIVIDING LARGER NUMBERS

There will be three figures in the quotient, but no remainder. Practice until you can divide 8 or 10 of these in 10 minutes.

Divide and check by multiplication:

1.	2.	3.	4.
$21\overline{)4914}$	$21\overline{)9156}$	$21\overline{)11067}$	$21\overline{)9198}$
5.	**6.**	**7.**	**8.**
$32\overline{)7552}$	$32\overline{)7936}$	$32\overline{)13536}$	$32\overline{)17088}$
9.	**10.**	**11.**	**12.**
$43\overline{)14706}$	$43\overline{)11481}$	$43\overline{)23091}$	$43\overline{)11395}$
13.	**14.**	**15.**	**16.**
$54\overline{)15444}$	$34\overline{)12716}$	$65\overline{)34840}$	$37\overline{)23236}$
17.	**18.**	**19.**	**20.**
$27\overline{)10368}$	$38\overline{)10146}$	$67\overline{)36716}$	$86\overline{)54524}$

Find the quotients and remainders and check:

21. 46035 ÷ 58
22. 86644 ÷ 47
23. 64246 ÷ 67
24. 31533 ÷ 97
25. 40095 ÷ 38
26. 13555 ÷ 87
27. 31533 ÷ 58
28. 60803 ÷ 85
29. 65400 ÷ 57
30. 26068 ÷ 98
31. 96068 ÷ 86
32. 83472 ÷ 35
33. 69842 ÷ 52
34. 28465 ÷ 97
35. 46287 ÷ 77
36. 96242 ÷ 78
37. 36245 ÷ 95
38. 46791 ÷ 85
39. 78391 ÷ 68
40. 72983 ÷ 48
41. 47621 ÷ 36
42. 64371 ÷ 46
43. 98428 ÷ 57
44. 46792 ÷ 87

PROBLEMS WITHOUT NUMBERS

1. If you know how many children in the second grade and how many in the third grade, how can you find the number in both grades?

2. How can you find how many more in one grade than in the other?

3. If you know how much money you have in your bank and how much you take out, how can you find how much you have left?

4. If you know how much a boy earns in one week, how can you find how much he earns in five weeks?

5. If you are saving to buy something, how can you find at any time during your saving how much more money you need?

6. If you know your weight and that of another pupil, how can you find how much more or less you weigh? How can you find how much both weigh?

7. When you know the cost per dozen, how can you find how much one costs?

8. If you know how many pupils in your class and how many of them are boys, how can you find how many girls?

9. When you know how many pages in a book, and how many you have read, how can you find how many more to read?

10. If a boy knows how many eggs he gathers in a week, how can he find the average number gathered per day?

11. If a boy knows how many quarts of feed he uses per day for his hens, how can he find how much he needs per week?

12. Besides the cost per pound, what would your mother have to know to find the cost of a roast of beef? How, then, would she find the cost of the roast?

13. If you know the cost of a class picnic, how can you find the average cost per pupil?

14. If you know your increase in weight for a year, how can you find the average increase per month?

HOW A FOURTH-GRADE CLASS BOUGHT A FLAG

1. Some fourth-grade children wanted to buy a flag for their room. They found a nice large one for $9.75. They investigated several ways of earning money. Finally they decided to sell pencils. They found where they could buy a good 5¢ pencil for $4.85 a gross (144 pencils). How much can they make on each gross?

2. If they can sell 4 gross, how nearly will they have enough money to buy the flag?

3. If they sell 5 gross, how much will they have left after buying the flag?

4. There are 36 pupils in the grade. If each pupil sells 4 pencils, how many will all sell?

5. Since each pupil will have to sell 4 pencils to sell a gross, how many will each have to sell to sell 4 gross? To sell 5 gross?

6. These children thought of having a "Candy Sale." They estimated that they could make chocolate fudge at a cost of 22¢ a pound and sell it in $\frac{1}{4}$-pound packages at 10¢ each. If they could sell 100 packages, how much money would they make?

7. Had each of the 36 pupils brought an equal sum of money, how much would each have had to give to pay for the flag?

8. Can you think of some ways to make money for some purpose?

PLANNING A PICNIC LUNCHEON

Some children were planning a picnic. They found that 18 wished to go. Here are some problems that they had to solve about the cost:

1. The carfare is 60¢ each. A large truck offers to take them for $9.00 Which is cheaper, and how much?

2. They decided to take 2 doz. ham sandwiches and 2 doz. cheese sandwiches. The ham sandwiches can be bought for 10¢ each, and the cheese at 2 for 15¢. How much will they cost?

3. To make the ham sandwiches will take 2 doz. rolls at 15¢ a dozen, $1\frac{1}{4}$ lb. ham at 80¢ a pound, and $\frac{1}{2}$ lb. of butter at 50¢ a pound. Compare the cost with the cost of buying them ready-made.

4. To make the cheese sandwiches will require 2 loaves of sandwich bread at 18¢ a loaf, $1\frac{1}{2}$ lb. of cream cheese at 40¢ a pound, and $\frac{1}{2}$ lb. butter at 50¢ a pound. Compare the cost with the cost of buying them ready-made.

5. Would you advise the children to make or to buy the sandwiches? These children decided to buy them.

6. They took $1\frac{1}{2}$ doz. pickles costing 30¢ a dozen, and 2 bottles of olives costing 25¢ each. Find the cost.

7. They took 18 bananas costing 40¢ a dozen. Find the cost.

8. They bought $2\frac{1}{2}$ doz. fancy cakes at 40¢ a dozen. These cost how much?

9. Paper napkins and other expenses amounted to 50¢. Find the total cost if they took the truck.

10. If they shared the expense equally, how much did each have to pay?

TEST IN ADDITION

You should add these 6 in 3 minutes. They contain all of the addition facts when adding down.

1.	2.	3.	4.	5.	6.
615	643	576	324	347	765
955	383	877	645	789	456
838	219	239	679	876	768
773	791	597	938	965	214

A TEST IN PROBLEM SOLVING

Solve all you can in 20 minutes:

1. When you pay $2 for 8 dozen apples, how much a dozen do they cost?

2. At 8¢ each, how many melons can you buy for $2?

3. If you buy a sled for $3.75 and pay with a ten-dollar bill, how much change should you receive?

4. John bought 2 boxes of crackers at 8¢ a box and a pound of coffee for 32¢. How much change should he get from a two-dollar bill?

5. George bought apples at 40¢ a dozen and sold them at 5¢ each. How much did he make on ten dozen?

6. At the rate of 2 apples for 5¢, how many can you buy for 25¢?

7. A girl is going to send out 38 invitations to her party. She has written 19. How many more has she to write?

8. A brick of ice cream will serve 6 people. How many bricks will be needed to serve a party of 30 people?

9. Gertrude ordered 5 bricks of ice cream for a party. There are just 35 present including herself. She must cut each brick into how many pieces to serve each equally?

10. Frank received $3.75 for 15 hours' work. That was how much per hour?

11. A school has $9 to spend for candy for a Christmas party. At 36¢ a pound, how much can be bought?

12. A class has 16 pounds of candy which they wish to put up in $\frac{1}{4}$-pound packages. How many packages will there be?

13. A class of 32 pupils went on a picnic. The fare cost $6.50 and the refreshments cost $8.22. If they share the expense equally, how much will it cost each?

PRACTICE IN ADDITION

You should add 20 like these in about 5 minutes.

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
7	3	8	3	8	1	9	7	8	8
9	7	6	7	1	9	2	5	6	7
6	9	9	9	9	6	7	7	6	8
2	6	4	6	3	7	3	6	9	9
4	4	7	9	7	4	1	4	4	6
5	1	8	4	8	9	8	8	7	3

11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
3	5	6	3	8	7	6	1	3	8
9	8	5	7	8	3	5	7	5	4
7	9	9	6	5	9	8	9	9	1
6	4	8	6	6	9	7	8	6	9
4	3	4	9	7	4	3	6	9	6
3	7	4	2	1	7	9	5	2	7

You should add 10 like these in about 5 minutes.

1.	2.	3.	4.	5.
396	785	399	269	934
784	268	487	387	269
329	931	560	564	843
506	476	347	780	728

6.	7.	8.	9.	10.
713	864	563	879	219
269	235	784	396	763
874	469	329	784	846
356	781	546	257	591

PRACTICE IN SUBTRACTION

You should practice daily until you can subtract these 20 in 8 minutes. They contain all of the subtraction facts.

1.	2.	3.	4.	5.
80137	71524	59413	98055	72400
34442	61661	18871	84192	22560

6.	7.	8.	9.	10.
95258	84648	68109	50718	69305
25886	68558	45283	48745	56144

11.	12.	13.	14.	15.
76284	96328	80135	96127	43069
41694	68841	11053	20751	26271

16.	17.	18.	19.	20.
41072	63927	78463	93712	94357
18691	26482	42683	38562	28679

DRILL EXERCISES

Subtract and check:

1.	2.	3.	4.	5.
426	584	705	846	726
163	268	261	329	318

6.	7.	8.	9.	10.
835	926	849	693	735
284	783	256	149	482

PRACTICE IN MULTIPLICATION

You should multiply 16 like these in 4 minutes.

1.	2.	3.	4.	5.	6.	7.	8.
36	27	81	94	47	65	29	38
8	6	7	5	7	9	8	6

9.	10.	11.	12.	13.	14.	15.	16.
67	48	59	83	86	97	48	59
5	8	7	6	5	6	7	6

You should multiply 8 like these in 5 minutes.

1.	2.	3.	4.	5.	6.	7.	8.
94	58	63	97	86	75	86	92
36	47	45	86	58	47	59	47

9.	10.	11.	12.	13.	14.	15.	16.
74	87	49	75	69	56	79	68
98	65	26	84	87	94	86	56

PRACTICE IN DIVISION

You should practice until you can divide 6 like these in about 5 minutes.

1.	2.	3.	4.	5.
$34\overline{)1789}$	$56\overline{)2148}$	$72\overline{)3248}$	$65\overline{)2764}$	$92\overline{)5687}$

6.	7.	8.	9.	10.
$84\overline{)5761}$	$72\overline{)3769}$	$81\overline{)4628}$	$54\overline{)1897}$	$85\overline{)6368}$

11.	12.	13.	14.	15.
$48\overline{)2675}$	$54\overline{)3968}$	$47\overline{)2265}$	$38\overline{)1769}$	$84\overline{)5846}$

DIVIDING DOLLARS AND CENTS BY DOLLARS AND CENTS

1. At 15¢ each how many melons can you buy for 75¢?

2. At 15¢ each, how many melons can you buy for $1.20?

$15\overline{)120}$ *Before dividing, $1.20 must be expressed in cents.*

3. One Saturday Walter sold asparagus at 25¢ a bunch to those passing his father's garden. He took in $12.50. How many bunches did he sell?

4. Some children are giving a school entertainment. They are going to charge 35¢ admission. The expenses are $8.40. How many tickets will they have to sell to pay the expenses?

5. Mrs. Brown pays 18¢ a quart for milk. One month her bill was $9.72. She must have had how many quarts?

6. Ralph has $20 with which he wishes to buy a flock of young hens. He knows where he can get some at $1.25 each. How many can he buy?

$125\overline{)2000}$ *Write both as cents before dividing.*

7. At $1.15 each, how many hens can Donald buy with $13.80 that he has saved for the purpose?

8. Walter gets 35¢ an hour for mowing lawns. How many hours must he work to earn enough to buy a bicycle costing $17.85?

9. A fourth-grade class gave an entertainment and took in $21.25. The tickets were 25¢ each. They must have sold how many?

10. Frank is getting subscriptions for a magazine. He gets 50¢ for every subscription. How many will he have to get to buy a tool chest that costs $6.50?

11. John sold enough tomatoes from his garden at 85¢ a basket to buy a bicycle costing $20.40. How many baskets did he sell?

12. Ralph wants to earn enough to buy a coaster costing $7.20. He earns 45 cents a day after school. How long will it take him to earn enough to buy it?

REVIEW PROBLEMS

1. When maple sirup is $2.40 a gallon, how much is that a quart?

2. At 25¢ a yard, how much gingham can be bought for $5?

3. At 38¢ a pound, how much will $\frac{1}{2}$ lb. of meat cost?

4. At 80¢ a pound, how much will $\frac{3}{4}$ lb. of chocolate candy cost?

5. At $3.20 a bushel, how much will a peck of apples cost?

6. At 80¢ a dozen, how much will 6 oranges cost?

7. How much will 18 oranges cost at 60¢ a dozen?

8. How much will $2\frac{1}{2}$ lb. of meat cost at 36¢ a pound?

9. It took $3\frac{3}{4}$ yd. of gingham to make Mary a dress. At 36¢ a yard, how much did it cost?

10. Mary bought 12 yd. of denim at $18\frac{1}{2}$¢ a yard to make some skate bags for presents. The thread and tape cost 18¢. She made 16 bags. Find the cost of each.

11. When tea is selling at 60¢ a pound, how much should a 4-ounce package cost?

12. When mixed candy is selling at 48¢ a pound, how much should 12 oz. cost?

13. When butter is 48¢ a pound, how much should $2\frac{1}{2}$ lb. cost?

14. Walter sold $3\frac{1}{2}$ doz. eggs at 72¢ a dozen. How much did he get for them?

15. At 75¢ a peck, how much will a bushel of potatoes cost?

16. When milk is selling at 18¢ a quart, how much is that a gallon?

17. When ribbon is 96¢ a yard, how much is a foot of ribbon worth?

18. If John can walk 4 miles per hour, how long will it take him to walk 6 miles? 10 miles?

A TEST IN SOLVING PROBLEMS

Answer as many as you can in 15 minutes.

1. At 2 for 5¢, how much will 6 marbles cost?
2. At 2 for 5¢, how many marbles can you get for 20¢?
3. At 3 for 10¢, how many apples can you buy for 20¢?
4. At 3 for 10¢, how much will 12 apples cost?
5. Two pounds of candy will make how many 4-ounce packages?
6. When candy is 40¢ a pound, how much will $\frac{1}{2}$ lb. cost?
7. When candy is 40¢ a pound, how much should you get for 10¢?
8. When rolls are 20¢ a dozen, what will $1\frac{1}{2}$ dozen cost?
9. When butter is 56¢ a pound, what will 8 oz. cost?
10. $1\frac{1}{2}$ yards of ribbon will make how many 9-inch badges?
11. When John feeds his rabbits 2 quarts of grain a day, how long will a bushel last?
12. When you get 2 dozen buns for 25¢, how much will 6 dozen cost?
13. Mary is 12 years old and her little sister is half as old. How old will Mary be when her sister is 10 years old?

DIVIDING BY NUMBERS LESS THAN 20

1. One Saturday 16 pupils from the Hillside School went on a picnic. The total expense was \$7.36, which they wished to share equally. How much should each pay?

$$\begin{array}{r} \$0.46 \\ 16\overline{)\$7.36} \\ \underline{64} \\ 96 \\ \underline{96} \end{array}$$

Here to divide 7 by 1 gives no clue to the quotient. You will have to guess and try by multiplying mentally. If you think "perhaps 5," then multiply 16 by 5. $5 \times 16 = 80$. So 5 is too large. Try 4. $4 \times 16 = 64$. So 4 is right. To find $96 \div 16$, try 6. $6 \times 16 = 96$. So 6 is right. So each must pay 46¢.

This is right, for $16 \times 46¢ = \$7.36$.

2. There are 630 pupils and 18 teachers in the school that Ralph attends. That is an average of how many pupils for each teacher?

$$\begin{array}{r} 35 \\ 18\overline{)630} \\ \underline{54} \\ 90 \\ \underline{90} \end{array}$$

Try 2×18, 3×18, and 4×18. 3 is right. Next try 4×18 and 5×18. 5 is right.

3. Divide 782 by 17.
4. Divide 917 by 16.

DRILL TABLE

To divide by numbers from 12 to 19, you must be able to find the following products quickly without a pencil.

2×12	2×13	2×14	2×15
3×12	3×13	3×14	3×15
4×12	4×13	4×14	4×15
5×12	5×13	5×14	5×15
6×12	6×13	6×14	6×15
7×12	7×13	7×14	7×15
8×12	8×13	8×14	8×15
9×12	9×13	9×14	9×15

2×16	2×17	2×18	2×19
3×16	3×17	3×18	3×19
4×16	4×17	4×18	4×19
5×16	5×17	5×18	5×19
6×16	6×17	6×18	6×19
7×16	7×17	7×18	7×19
8×16	8×17	8×18	8×19
9×16	9×17	9×18	9×19

DIVISION BY NUMBERS FROM 12 TO 19

1. Frank sold 14 baskets of apples for $23.10. How much was that for each basket?

2. Walter's father drove 270 miles on 15 gallons of gasoline. How many miles did he average per gallon?

3. The lunch for a picnic party of 16 cost $5.60. How much was that for each?

4. The first 17 days that George had a paper route he earned $7.65. How much did that average each day?

5. Eighteen girls gave a surprise party for a classmate on her birthday. It cost them $8.10 for the refreshments and a present. How much was that for each girl?

6. Ralph sold 19 dozen eggs one month and got $10.64 for all. That was an average of how much per dozen?

Find the quotients and check:

1. 532 ÷ 14	5. 1072 ÷ 16	9. 1292 ÷ 19
2. 816 ÷ 17	6. 1026 ÷ 18	10. 1302 ÷ 14
3. 864 ÷ 18	7. 1216 ÷ 16	11. 1462 ÷ 17
4. 952 ÷ 17	8. 1368 ÷ 19	12. 1596 ÷ 19

13.	14.	15.	16.	17.
$15\overline{)4440}$	$16\overline{)7776}$	$17\overline{)6664}$	$16\overline{)8464}$	$18\overline{)6966}$

ZEROS IN THE QUOTIENT

1. Divide 4992 by 24.

$$\begin{array}{r} 208 \\ 24\overline{)4992} \\ 48 \\ \hline 192 \\ 192 \\ \hline \end{array}$$

When 9 was annexed to the remainder, giving 19, this was smaller than the divisor, so 0 was written in the quotient above 9 and the next number was annexed. This gives the right answer, for $24 \times 208 = 4992$.

Find the quotients and check:

2.	3.	4.	5.	6.
$24\overline{)5016}$	$36\overline{)11052}$	$53\overline{)32224}$	$64\overline{)45056}$	$46\overline{)23276}$
7.	**8.**	**9.**	**10.**	**11.**
$73\overline{)29711}$	$43\overline{)21629}$	$26\overline{)15730}$	$34\overline{)30702}$	$23\overline{)13984}$

12. Divide 8850 by 26.

$$\begin{array}{r} 340 \\ 26\overline{)8850} \\ 78 \\ \hline 105 \\ 104 \\ \hline 10, \text{ rem.} \end{array}$$

When 0 was annexed to the 1 remaining after the second division, 10 was smaller than 26, so 0 was written in the quotient to show that 10 would not contain 26.

Find the quotients and check:

13.	14.	15.	16.	17.
$36\overline{)2520}$	$24\overline{)3131}$	$32\overline{)8320}$	$42\overline{)14295}$	$34\overline{)14280}$

EXPRESSING REMAINDERS IN LONG DIVISION

1. John sold 4 baskets of apples for \$5. That averaged how much per basket?

A		*B*
$4\overline{)\$5}$	*The result may be expressed as in A or as in B. Which is more common?*	$4\overline{)\$5.00}$
$\$1\frac{1}{4}$		\$1.25

2. Ralph sold 4 broilers. Together they weighed 5 pounds. How much did they average?

A 4)5 lb. $1\frac{1}{4}$ lb.	*Just as the quotient of \$5 ÷ 4 can be expressed in two ways, so can the quotient of 5 lb. ÷ 4 be expressed in two ways as shown in A and B. How is $1\frac{1}{4}$ lb. read? 1.25 lb. is read "one and twenty-five hundredths pounds."*
B 4)5.00 lb. 1.25 lb.	

Except when dividing dollars, the remainders in short division are usually written over the divisors giving fractions.

But in long division, a period and two or more 0's are written and the division continued. This gives a new form of fraction called a *decimal fraction.*

3. Divide 1629 by 36.

```
   45.25
36)1629.00
   144
   189
   180
    90
    72
   180
   180
```

After dividing 1629, there was a remainder of 9. So a period and 00 were written in the dividend and the division continued. To show that all the quotient after 45 was a fraction, a period was written separating the 45 from the 25. The quotient is "forty-five and twenty-five hundredths."

Find the quotients and read them:

4.	5.	6.	7.	8.
$48\overline{)1188}$	$25\overline{)854}$	$24\overline{)906}$	$56\overline{)1526}$	$64\overline{)1520}$

9. A man drove 438 miles on 24 gallons of gasoline. Find the average number of miles per gallon.

REMAINDERS AFTER HUNDREDTHS

1. Ralph's father drove his car 328 miles on 24 gallons of gasoline. That was an average of how many miles per gallon?

```
   13.66
24)328.00
   24
   88
   72
  160
  144
  160
  144
   16
```

After continuing the division two places to get hundredths, there is still a remainder of 16. Since 16 is more than half of the divisor (24) we replace the last 6 by a 7. The answer is "13 and 67 hundredths miles, nearly."

Most divisions still have a remainder after carrying the quotient to hundredths. If the remainder is half or more of the divisor, increase the last number in the quotient by 1. If the remainder is less than half the divisor, do not change the last number in the quotient.

Divide and carry the quotient to hundredths:

2.	3.	4.	5.	6.
$34\overline{)761}$	$26\overline{)137}$	$42\overline{)196}$	$53\overline{)276}$	$63\overline{)178}$
7.	**8.**	**9.**	**10.**	**11.**
$43\overline{)226}$	$67\overline{)357}$	$73\overline{)376}$	$82\overline{)345}$	$74\overline{)299}$

12. Fred's father has a light car which he drove 426 miles on 18 gallons of gasoline. That was an average of how many miles per gallon?

13. The 36 pupils in the fourth grade of the Lincoln School want to raise $85 to buy a phonograph. That will be an average of how much for each?

14. During the month of December Mary's mother bought 102 quarts of milk for the family. That was an average of how many quarts per day?

PROBLEMS WITHOUT NUMBER

1. How can you find how many children in the first three grades of your school if you know how many in each grade?

2. How can you find the average number of pupils in each of the first three grades?

3. How can you find the average daily attendance in your school for a week?

4. If a boy sells 50 papers a week, how can you find what he makes on them?

5. If a boy buys eggs from the country and sells them to his neighbors, how can you tell how much he makes per dozen? How can you tell how much he makes per week?

6. If your school sells tickets to meet the expense of an entertainment, how can you find how many tickets must be sold to meet the expenses?

7. If a man knows the weight of a wagon when loaded with wheat, how can he find the weight of the wheat?

8. If you know the year in which a man was born, how can you find how old he is?

9. If your mother buys a remnant of cloth by the piece, how can she tell how much one yard cost?

10. If Ralph knows how much money he had when he went shopping and how much he had when he got home, how can he tell how much he spent?

11. When you know the cost of a bushel of apples, how can you tell how much a peck costs?

12. When you know the cost of a quart of milk, how can you tell how much a gallon costs?

13. When you know the sum of two numbers and one of the numbers, how can you find the other?

14. When you know the product of two numbers, and one of them, how can you find the other?

REVIEWING THE MEANING OF FRACTIONS

1. Frank had a small cake and divided it into four equal pieces. He gave one piece to his little brother and two pieces to his sister.

One of the four equal pieces is called *one fourth*.
Two of the four equal pieces are called *two fourths*.

One fourth is written $\frac{1}{4}$.

Two fourths is written $\frac{2}{4}$.

Four fourths of the cake are all of it, so we say, "Four fourths of anything equals all of it." This is written $\frac{4}{4} = 1$.

2. By what other name can you call $\frac{2}{4}$ of a cake?

You can see that two fourths make one half.
This is written $\frac{2}{4} = \frac{1}{2}$.

3. This pie is cut into six equal parts. So each piece is "one of the six equal pieces." Instead of saying "one of the six equal pieces," what shorter name may we use?

One sixth is written $\frac{1}{6}$.

4. *Write in figures:*

two sixths	four sixths
three sixths	five sixths

5. Look at the picture and tell how many sixths there are in half of a pie.

This is written $\frac{3}{6} = \frac{1}{2}$.

REVIEWING THE MEANING OF FRACTIONS

Write the figures that mean:

1. Three of the four equal parts.
2. Five of the six equal parts.
3. Seven of the eight equal parts.
4. Two of the three equal parts.

Read these fractions and tell what they mean:

5. $\frac{1}{6}$ of a stick of candy.
6. $\frac{5}{6}$ of a pie.
7. $\frac{2}{3}$ of a yard of ribbon.
8. $\frac{5}{8}$ of a pound of candy.
9. From $\frac{1}{2}$ of a pie, you could make how many fourths of a pie? How many sixths? How many eighths?

Tell which of these fractions are more than $\frac{1}{2}$ and which are less:

10. $\frac{3}{4}$, $\frac{3}{8}$, $\frac{5}{8}$, $\frac{5}{6}$, $\frac{1}{4}$, $\frac{3}{10}$, $\frac{7}{10}$, $\frac{5}{12}$, $\frac{7}{12}$.

Fill the blanks:

11. $\frac{1}{2} = \frac{\quad}{4} = \frac{\quad}{6} = \frac{\quad}{8} = \frac{\quad}{10} = \frac{\quad}{12} = \frac{\quad}{16}$

Fill the blanks:

12. $1 = \frac{\quad}{2} = \frac{\quad}{3} = \frac{\quad}{4} = \frac{\quad}{5} = \frac{\quad}{6} = \frac{\quad}{7} = \frac{\quad}{8} = \frac{\quad}{9} = \frac{\quad}{10}$

13. Mary's mother made two cherry pies and cut each into six equal pieces. How many pieces had she? One of the pieces is called what part of the pie?

14. Two pies make how many sixths?

This is written $2 = \frac{12}{6}$.

ADDING FRACTIONS. MAKING CANDY

1. To make candy Helen used $1\frac{3}{4}$ cups of granulated sugar and $\frac{3}{4}$ of a cup of brown sugar. How much sugar did she use?

$1\frac{3}{4}$ *Think,* "$\frac{3}{4} + \frac{3}{4} = \frac{6}{4}$." *Then think* "$\frac{6}{4} =$
$\frac{3}{4}$ $\frac{4}{4} + \frac{2}{4}$, *or* $1\frac{2}{4}$, *or* $1\frac{1}{2}$." *Write* $\frac{1}{2}$ *and carry 1.*
$2\frac{1}{2}$ *Think* "*1 + 1 = 2.*" *Write 2.*

2. In making maple fudge, Nell used $1\frac{3}{4}$ cups of brown sugar and $2\frac{1}{4}$ cups of maple sugar. How much sugar did she use?

$1\frac{3}{4}$ *Think* "$\frac{3}{4} + \frac{1}{4} = \frac{4}{4}$, *or 1.*" *So carry 1.*
$2\frac{1}{4}$ *There is no fraction left to write down.*
4 *Then think* "*1 + 1 + 2 = 4.*" *Write 4.*

3. Mary used a recipe that required $\frac{3}{4}$ of a cup of brown sugar and $1\frac{1}{2}$ cups of granulated. How much sugar did she use?

$\frac{3}{4}$ *Think,* "$\frac{3}{4} + \frac{1}{2} = \frac{5}{4}$, *for* $\frac{1}{2} = \frac{2}{4}$." *Then*
$1\frac{1}{2}$ *think,* "$\frac{5}{4} = 1\frac{1}{4}$." *Write* $\frac{1}{4}$ *and carry 1. Then*
$2\frac{1}{4}$ *think,* "*1 + 1 = 2.*" *Write 2.*

Add:

4.	5.	6.	7.	8.
$1\frac{3}{4}$	$2\frac{1}{2}$	$1\frac{3}{4}$	2	$\frac{1}{2}$
$1\frac{1}{2}$	$1\frac{1}{2}$	2	$1\frac{1}{2}$	$2\frac{1}{2}$
$2\frac{3}{4}$	$2\frac{3}{4}$	$1\frac{1}{4}$	$\frac{3}{4}$	$3\frac{1}{4}$

9.	10.	11.	12.	13.
$2\frac{1}{4}$	$1\frac{1}{2}$	$3\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{2}$
$1\frac{1}{4}$	$3\frac{1}{4}$	2	$2\frac{3}{4}$	$1\frac{1}{2}$
$3\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{3}{4}$	$1\frac{1}{4}$	$1\frac{3}{4}$

SUBTRACTING FRACTIONS

1. Helen is going to make some candy. The recipe calls for $2\frac{3}{4}$ cups of sugar. She has only $1\frac{1}{4}$ cups. How much more does she need?

$2\frac{3}{4}$
$1\frac{1}{4}$
$1\frac{1}{2}$

Think, "$\frac{2}{4}$ or $\frac{1}{2}$ more will make $\frac{3}{4}$." Write $\frac{1}{2}$.
Think, "1 and 1 make 2." Write 1.

2. Nell needs 3 yards of ribbon to trim some doll dresses. She has $1\frac{3}{4}$ yards. How much more does she need?

3
$1\frac{3}{4}$
$1\frac{1}{4}$

Think, "$\frac{1}{4}$ more will make 2." Write $\frac{1}{4}$.
Think, "2 and 1 make 3." Write 1.

3. Frank needs $3\frac{1}{4}$ feet of copper wire to mend some toys. He has $1\frac{3}{4}$ feet. How much more does he need?

$3\frac{1}{4}$	*Think, "$\frac{1}{4}$ more will make 2." Do not write*
$1\frac{3}{4}$	*$\frac{1}{4}$, but add it to the $\frac{1}{4}$ that he needs.* $\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$.
$1\frac{1}{2}$	*Write $\frac{1}{2}$. Think, "2 and 1 are 3." Write 1.*

Study these three problems carefully and see if you can subtract all the following exercises without making a mistake.

Subtract at sight:

4.	5.	6.	7.	8.	9.
$4\frac{3}{4}$	$5\frac{1}{2}$	$4\frac{1}{2}$	$5\frac{1}{4}$	$6\frac{3}{4}$	$4\frac{1}{2}$
$2\frac{1}{4}$	$3\frac{1}{4}$	$2\frac{1}{2}$	$3\frac{1}{4}$	$3\frac{3}{4}$	$4\frac{1}{4}$
10.	**11.**	**12.**	**13.**	**14.**	**15.**
2	3	3	4	5	2
$1\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{3}{4}$	$3\frac{1}{2}$	$4\frac{1}{4}$	$1\frac{3}{4}$
16.	**17.**	**18.**	**19.**	**20.**	**21.**
$5\frac{1}{4}$	$6\frac{1}{2}$	$2\frac{1}{4}$	$4\frac{1}{4}$	$3\frac{1}{4}$	$2\frac{1}{4}$
$2\frac{3}{4}$	$3\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{3}{4}$	$1\frac{1}{2}$

SUBTRACTING FRACTIONS

1. Helen had $1\frac{3}{4}$ yards of ribbon. She used $\frac{1}{4}$ of a yard to trim a doll's dress. How much had she left?

2. Frank weighed $58\frac{1}{4}$ pounds in February and $61\frac{1}{2}$ pounds in August. How much had he gained in weight?

3. John bought $1\frac{1}{2}$ pounds of candy. If he gives his sister $\frac{3}{4}$ of a pound, how much will he have left?

4. Walter weighed $72\frac{3}{4}$ pounds in July and $74\frac{1}{4}$ pounds in December. Find the increase.

Subtract:

5.	6.	7.	8.	9.
$12\frac{3}{4}$	$13\frac{3}{4}$	$12\frac{1}{4}$	$24\frac{1}{4}$	$20\frac{1}{2}$
$9\frac{1}{4}$	$8\frac{1}{2}$	$7\frac{1}{2}$	$17\frac{3}{4}$	$16\frac{1}{4}$

10.	11.	12.	13.	14.
$26\frac{1}{4}$	$16\frac{1}{4}$	$17\frac{1}{4}$	$12\frac{1}{4}$	$15\frac{1}{2}$
$15\frac{1}{4}$	$12\frac{3}{4}$	$10\frac{1}{2}$	$6\frac{3}{4}$	$10\frac{3}{4}$

15.	16.	17.	18.	19.
$21\frac{1}{2}$	$18\frac{3}{4}$	$20\frac{1}{4}$	$18\frac{1}{4}$	$16\frac{1}{4}$
$16\frac{1}{2}$	$6\frac{3}{4}$	$16\frac{1}{2}$	$9\frac{3}{4}$	$7\frac{3}{4}$

MULTIPLYING A FRACTION

1. In patching his tent, Ralph needed two pieces of canvas, each containing $\frac{3}{4}$ of a yard. How much did he need in all?

$\frac{3}{4}$
$\frac{3}{4}$
$\frac{6}{4}$ or $1\frac{1}{2}$

By adding, we see that he needed $1\frac{1}{2}$ yards. Just as with whole numbers, this may be written as multiplication. Thus $2 \times \frac{3}{4} = \frac{6}{4}$, or $1\frac{1}{2}$.

2. James worked three afternoons, working $\frac{3}{4}$ of an hour each day. How much did he work in all?

$\frac{3}{4}$
$\frac{3}{4}$
$\frac{3}{4}$
$\frac{9}{4}$ or $2\frac{1}{2}$

To find it by multiplication we write
$3 \times \frac{3}{4} = \frac{9}{4}$, *or* $2\frac{1}{4}$.
To get $2\frac{1}{4}$ *from* $\frac{9}{4}$, *9 was divided by 4.*

3. Look at the multiplication in problems 1 and 2 and tell which term of the fraction was multiplied.

4. Mary made 4 towels, using $\frac{3}{4}$ of a yard for each. How much was used for all?

5. Fred uses $\frac{1}{2}$ of a peck of feed each day for his hens. How much will he use in a week?

6. Frank rode $6\frac{1}{4}$ miles in an hour. At this rate, how far can he ride in 3 hours?

After multiplying, if the top term is larger than the bottom term, divide it by the bottom term.

Give the answers quickly:

7. $3 \times \frac{1}{2}$	13. $7 \times \frac{3}{4}$	19. $6 \times \frac{3}{4}$
8. $4 \times \frac{1}{2}$	14. $8 \times \frac{1}{4}$	20. $5 \times \frac{2}{3}$
9. $5 \times \frac{1}{4}$	15. $9 \times \frac{3}{4}$	21. $6 \times \frac{2}{5}$
10. $6 \times \frac{1}{4}$	16. $7 \times \frac{1}{2}$	22. $7 \times \frac{5}{6}$
11. $4 \times \frac{3}{4}$	17. $9 \times \frac{1}{4}$	23. $8 \times \frac{2}{3}$
12. $5 \times \frac{1}{2}$	18. $10 \times \frac{3}{4}$	24. $9 \times \frac{5}{9}$

PROBLEMS WITH FRACTIONS

1. A recipe for candy calls for $\frac{3}{4}$ of a pound of brown sugar. If Nell wishes to take three times as much of each ingredient as the recipe calls for, how much brown sugar must she take?

2. Frank sold three pumpkins that weighed $7\frac{1}{2}$ pounds each. How much did all weigh? Find the answer by multiplication and prove by addition.

3. Frank weighs $58\frac{1}{2}$ pounds and Walter weighs $63\frac{1}{4}$ pounds. How much more does Walter weigh?

4. Walter caught three bass. One weighed $1\frac{3}{4}$ pounds, one $1\frac{1}{2}$ pounds, and the other $2\frac{3}{4}$ pounds. Find the weight of all.

5. Helen wanted to buy enough cloth to make four aprons that required $1\frac{3}{4}$ yards each. How much must she buy?

6. Some children are going to make sandwiches for a picnic. Mrs. Brown told them to allow $\frac{3}{4}$ of a pound of boiled ham for a dozen sandwiches. How much ham will they need for 5 dozen sandwiches?

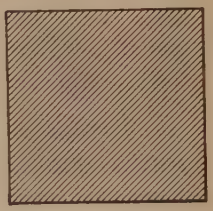
7. For a "Fair" some children are putting up bags of candy containing $\frac{1}{4}$ of a pound in each. How much candy will it take for 50 bags?

8. If Henry averages $\frac{3}{4}$ of an hour each day studying his arithmetic, how much is that for a week (5 days)?

9. It takes George $1\frac{1}{2}$ hours to mow the lawn. He mowed it 8 times during the summer. At 40¢ an hour, how much did he earn?

MEASURING SURFACES

In measuring surfaces, as the top of your desk, the blackboard, the floor of your room, or a garden, a square foot, or a square yard is used.



1. Measure each side of this square with your ruler. What is the length of each side?

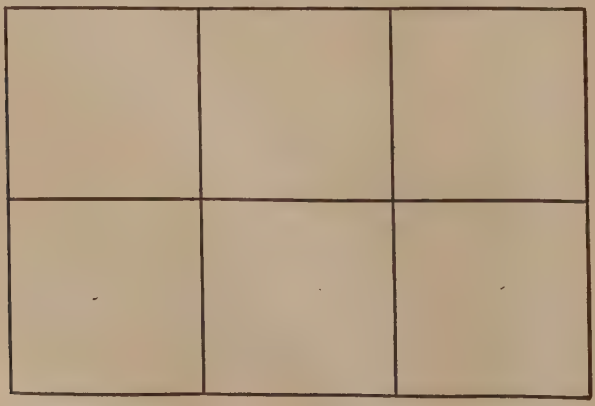
This square is called a **square inch.**

A square 1 foot on a side is a **square foot.**

A square 1 yard on a side is a **square yard.**

2. Draw a square foot on the blackboard. Draw a square yard. Cut a square foot and a square yard from a sheet of wrapping paper.

3. This figure is called a rectangle. Draw on paper a rectangle 2 inches wide and 3 inches long. How many square inches will it take to cover it?



4. Draw a rectangle 3 inches wide and 4 inches long and see how many square inches it will take to cover it.

5. Draw rectangles and lay them off into square inches and count them to see how many it would take to cover them.

6. Can you picture how many square inches it will take to cover a rectangle 2 inches wide and 4 inches long? Try to picture how many, then cover it with square inches and see if you were right.

7. Tell how many square inches it will take to cover a rectangle 3 inches wide and 5 inches long.

See if you can tell how many square inches it will take to cover a rectangle:

8. 2 in. wide and 8 in. long.

9. 2 in. wide and 12 in. long.

10. 3 in. wide and 8 in. long.

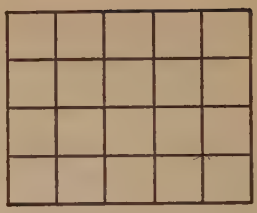
11. 3 in. wide and 12 in. long.

COMPUTING AREAS

The number of square inches, square feet, or square yards that it takes to cover a surface is called its *area*.

1. What is the area of a rectangle 2 in. wide and 4 in. long?

2. Which has more surface, a rectangle 3 in. wide and 6 in. long, or one 4 in. wide and 5 in. long?



3. These pictures represent rectangles **drawn to a scale.** That is, a shorter length than the real length is used to represent the rectangles and squares. Here $\frac{1}{4}$ in. represents 1 inch, and a square whose sides are each $\frac{1}{4}$ in. represents a square inch. Give the width and length of each and then give its area.

4. From these pictures, can you give a rule for finding the area of a rectangle without laying it off into squares?

HINT. — Do you see any relation between the two numbers in the width and length, and the number in the area?

Tell the area of a rectangle:

5. 4 inches wide and 7 inches long.
6. 5 inches wide and 8 inches long.
7. 5 inches wide and 10 inches long.
8. 6 inches wide and 12 inches long.
9. How many square inches in a square foot?

Think, "A square foot is 12 in. long and 12 in. wide, so it has 12 × 12 square inches, or 144 square inches."

10. You have seen that it is not necessary actually to measure a rectangle by a square inch to find its area but that

The number of inches in the length multiplied by the number of inches in the width is the number of square inches in the area.

MEASURING LARGER AREAS

1. Draw a picture of a square foot upon the blackboard or cut out a square foot from a piece of paper.

2. How many square feet would it take to cover a rug 2 ft. wide and 3 ft. long?

3. How many square feet would it take to cover a rug 3 ft. wide and 4 ft. long?

4. If the floor of your room is 18 ft. wide and 24 ft. long, how many square feet will it take to cover it?

24 18 192 24 432	*When you cannot multiply without a pencil, this is the way to write it down. That is, find the product of the* **number** *of feet in the length by the* **number** *of feet in the width, and the product is the* **number** *of square feet in the area.*

5. Cut a square yard from a large piece of wrapping paper. How many square yards will it take to cover a floor 3 yd. wide and 4 yd. long?

6. Mrs. Smith's kitchen is 4 yd. wide and 5 yd. long. How many square yards of linoleum will it take to cover it?

7. To cover a large hall 3 yd. wide and 10 yd. long will take how many square yards of linoleum?

8. Mr. Brown has a garden 24 yd. wide and 45 yd. long. How many square yards in its area?

45 24 180 90 1080	*Think, "The product of 24 × 45 will give the number of square yards. Since the product is 1080, the answer is 1080 square yards."*

NOTE TO THE TEACHER. — Be careful to keep the child from getting the erroneous notion that he can multiply feet by feet. He should use abstract numbers as given here.

COMPARING AREAS

1. George has a garden 18 ft. wide and 30 ft. long. Ralph has one 20 ft. wide and 28 ft. long. Find who has the larger garden and how much.

2. Helen's room is 10 ft. wide and 14 ft. long. Nell's is 12 ft. square. Whose room is larger and how much?

3. Donald has a lawn 48 ft. wide and 80 ft. long to mow. Frank has one 50 ft. wide and 75 ft. long. Who has to mow more and how much?

4. Mary and Nell are making "pin wheels" out of colored paper. Mary bought a sheet 28 in. wide and 60 in. long. Nell bought one 36 in. square. Which got the larger piece and how much?

5. Which do you think should cost more, a rug 6 ft. wide and 10 ft. long or one 7 ft. wide and 9 ft. long if both are of the same quality? Tell why.

6. At 30¢ a square foot, how much more will it cost to cover a kitchen floor 12 ft. wide and 15 ft. long with linoleum than to cover one only 10 ft. wide and 14 ft. long?

TABLE OF SURFACE MEASURE

1. Find how many square inches in a square foot. Find how many square feet in a square yard.

144 sq. in. = 1 sq. ft.
9 sq. ft. = 1 sq. yd.

2. How many square inches in 5 square feet?

3. How many square feet in 15 square yards?

4. How many square inches in $\frac{1}{2}$ of a square foot? In $\frac{1}{4}$ of a square foot?

5. How many square feet in $\frac{1}{2}$ of a square yard?

6. How much more than a square foot are 196 square inches?

7. Find the area of a sheet of paper 11 in. wide and 18 in. long, and tell how much more than a square foot.

8. In a room 12 ft. wide and 15 ft. long, how many sq. yd. in the floor area?

9. How many sq. yd. of linoleum will it take to cover a floor 12 ft. wide and 18 ft. long?

TEST IN SOLVING PROBLEMS

Score 10 for each problem you get right and see what score you can make in 30 minutes.

If you get all, your score is 100. But 80 is a very good score. After you solve a problem, go over the work and see if it is correct.

1. Eighteen children are going on a picnic to Pine Lake. The fare for the round trip is 85¢ for each. How much does it cost for all?

2. Will has saved $4.60. He wants to buy a sled costing $3.75 and a pair of skates costing $1.65. How much more does he need?

3. Mr. Harris pays $750 a year rent for a house. How much is that per month?

4. The children of a certain school want to buy a picture for their room that costs $6.30. There are 35 of them. If they share equally, how much will it cost each?

5. George earned $75.40 last year. That was an average of how much each week? (Year = 52 weeks.)

6. He hopes to average $1.75 per week this year. If he does, he must earn how much more than last year?

7. At a fair some boys bought a 5-gallon can of ice cream at $1.60 a gallon to sell by the dish. If they can average 8 dishes to the quart and get 10¢ a dish, how much will they make if they sell all of it?

8. They bought soda water at 85¢ a case (24 bottles) and sold it at 5¢ a bottle. How much did they make on 5 cases?

9. They bought a 25-pound pail of candy at 22¢ a pound and sold it all in 4-ounce packages at 10¢ a package. How much did they make?

10. Mrs. Williams bought a 14½-pound turkey for their Thanksgiving dinner. Turkeys cost 48¢ a pound. How much did it cost her?

TESTS IN COMPUTATION IN ADDITION

You should now be able to add all of these 20 in 5 minutes. If not, practice on adding six one-figured numbers until you can.

6	8	3	7	8	3	6	9	9	7
3	9	8	5	7	5	5	3	9	6
9	2	7	6	9	2	6	9	7	7
5	6	6	9	9	9	4	2	5	3
4	4	4	4	4	8	8	4	8	9
7	1	2	7	6	7	6	9	4	2

5	4	2	6	7	8	9	6	4	5
7	2	5	2	8	4	7	5	6	4
7	8	9	7	4	3	9	4	8	9
9	6	7	9	9	6	8	9	7	8
8	6	8	5	3	9	5	7	9	7
6	7	8	6	3	6	7	5	3	8

TEST IN ADDING LONGER COLUMNS

You should now be able to add these 10 (or any 10 sets of 11 one-figured numbers) in 5 minutes.

6	7	3	1	7	2	5	6	2	5
9	5	6	9	2	3	2	1	5	9
3	3	5	6	5	9	6	6	7	3
4	9	9	3	4	6	5	8	6	6
5	6	7	8	3	4	7	2	2	8
6	8	2	7	2	5	4	4	1	4
7	4	8	4	9	7	3	2	4	7
5	6	4	2	7	8	6	9	9	2
3	2	3	9	8	3	8	7	8	1
2	5	2	5	6	2	1	3	3	6
4	3	6	7	4	9	4	8	9	7

After adding each column, check by adding in the opposite direction. Write down ten columns of eleven numbers each and time yourself to see how nearly you can add all in five minutes.

TEST IN ADDITION: THREE-FIGURED NUMBERS

You should now be able to add these 10 in 5 minutes and have 8 of them correct the first trial. If not, practice until you can.

1.	2.	3.	4.	5.
346	287	928	347	623
975	538	456	635	532
198	416	197	248	467
367	375	534	621	835

6.	7.	8.	9.	10.
543	329	534	279	574
285	847	268	346	465
695	658	379	928	278
138	191	432	463	364

You should be able to add these 5 in 5 minutes and have 4 of them right the first trial.

1.	2.	3.	4.	5.
239	842	973	287	496
734	261	834	938	513
579	546	189	342	827
163	852	763	854	352
375	284	631	987	659
536	528	376	194	763
263	175	834	235	168
546	469	357	642	831

TEST IN SUBTRACTION

You should be able to subtract these 20 in 5 minutes.

1.	2.	3.	4.	5.
394	586	639	793	861
128	249	164	347	538

6.	7.	8.	9.	10.
738	748	692	837	965
296	564	237	643	492

11.	12.	13.	14.	15.
716	584	506	964	748
294	168	184	291	497

16.	17.	18.	19.	20.
639	975	856	946	831
275	239	129	387	196

TESTS IN MULTIPLICATION

You should find the 15 products in 6 minutes.

1.	2.	3.	4.	5.
2463	8291	5236	4296	6342
6	4	5	9	7

6.	7.	8.	9.	10.
6532	1859	6793	8546	7983
5	7	9	8	6

11.	12.	13.	14.	15.
7632	8594	3628	9463	6984
9	4	6	7	8

You should find these 12 products in 6 minutes.

1.	2.	3.	4.	5.	6.
48	96	87	75	56	56
94	27	37	96	84	83

7.	8.	9.	10.	11.	12.
83	89	65	74	87	96
79	47	69	76	56	34

You should find any 5 products in 5 minutes.

1.	2.	3.	4.
48×396	53×486	35×968	64×926
57×463	48×876	67×684	57×834
63×963	92×279	48×956	82×769
29×896	76×674	49×784	39×857
85×786	89×368	28×847	78×853

TESTS IN DIVISION

You should do the 16 exercises in 4 minutes.

1.	2.	3.	4.
$6\overline{)4628}$	$7\overline{)9563}$	$8\overline{)6397}$	$5\overline{)6492}$
5.	**6.**	**7.**	**8.**
$9\overline{)8546}$	$8\overline{)6984}$	$6\overline{)7568}$	$5\overline{)2469}$
9.	**10.**	**11.**	**12.**
$7\overline{)5347}$	$4\overline{)3798}$	$5\overline{)7634}$	$9\overline{)8375}$
13.	**14.**	**15.**	**16.**
$6\overline{)5943}$	$8\overline{)6791}$	$7\overline{)2967}$	$7\overline{)4169}$

You should do any 6 exercises in 5 minutes.

1.	2.	3.
$7358 \div 84$	$6341 \div 96$	$7654 \div 85$
$6371 \div 76$	$3485 \div 54$	$6732 \div 79$
$5463 \div 85$	$4736 \div 63$	$5460 \div 64$
$6971 \div 93$	$5908 \div 76$	$4927 \div 57$
$4564 \div 75$	$4329 \div 84$	$3946 \div 48$
$9136 \div 95$	$7321 \div 87$	$5632 \div 76$

A TEST IN QUICK THINKING

Without a pencil, see how quickly you can solve these:

1. When oranges are 60¢ a dozen, how many should you get for 25¢?

2. When apples are 2 for 5¢, how many should you get for 25¢?

3. At 3 apples for 10¢, how much should a dozen cost?

4. When you buy 10 apples for 25¢, how much does one apple cost you?

5. If you have 60¢, spend 25¢, and earn 40¢, how much will you then have?

6. On a 100-mile trip Charles rode 35 miles in an automobile and went on a boat the rest of the way. How far did he go by boat?

7. If a pint of lemonade will make 2 glasses, how many glasses in 2 quarts?

8. When oranges are 50¢ a dozen, how much will $1\frac{1}{2}$ dozen cost?

9. When your mother pays 16¢ a quart for milk, how much a gallon is it costing her?

10. When a 4-ounce package of candy costs 15¢, how much a pound is that?

11. When you pay 40¢ for a $\frac{1}{2}$-pound box of candy, how much a pound does it cost you?

12. When $\frac{1}{4}$ of a yard of lace costs 30¢, how much a yard does it cost?

ANSWERS

NOTE. — No answers are given to drill exercises. They should be checked by the pupil.

THIRD YEAR

Page 43. — **1.** 193 mi. **2.** 29 mi. **3.** $1.85. **4.** $1.60. **5.** 80¢. **6.** $1.75. **7.** 181 mi. **8.** 260. **9.** 164.

Page 57. — **1.** 65¢. **2.** $1.60. **3.** $2.55. **4.** $1.35. **5.** $7.00. **6.** $3.00.

Pages 66–67. — **1.** $3.48. **2.** $3.28. **3.** $7.24. **4.** $4.28. **5.** $0.87. **6.** $3.26. **7.** $0.87. **8.** $0.83.

Page 77. — **1.** $3. **3.** 75¢. **4.** $1.20. **5.** 30¢.

Page 78. — **1.** $6.75. **2.** $3.20. **3.** $5.50. **4.** $2.17. **5.** $1.82. **6.** $1.90. **7.** $13.95. **8.** $2.15. **9.** $4.13. **10.** $1.55. **11.** $0.85.

Page 79. — **11.** 35¢. **13.** 45¢; 30¢; 60¢; $1.35.

Page 82. — **1.** $1.52. **2.** $1.80. **3.** $1.08. **4.** $3.40. **5.** $3.00. **6.** $2.28. **7.** $1.48. **8.** $7.40. **9.** $5.34. **10.** $2.60.

Page 87. — **1.** 714 mi. **2.** 2240. **3.** $11.40. **4.** $8.15. **5.** $1.50. **6.** $2.65.

Pages 88–89. — **1.** $1.15. **2.** $3.22. **3.** $1.75. **4.** $4.14. **5.** $1.93. **6.** $3.80. **7.** $1.80. **8.** $2.84. **9.** $4.22. **10.** $0.58. **11.** $1.90. **12.** $0.85. **13.** $11.55.

Pages 91–92. — **8.** 18°. **9.** 40°. **10.** 48°. **11.** 103°. **12.** 24°. **13.** 13°. **14.** 180°. **15.** 6°. **16.** 4°. **18.** 18°.

Pages 114–115. — **1.** $1.40. **2.** 47. **3.** 39. **4.** 57¢. **5.** $1.70. **6.** 35 da. **7.** 39. **8.** 26. **9.** $1.90. **10.** 37. **11.** $13.75. **12.** 18.

Page 117. — **1.** $12.90. **2.** $4.68. **3.** $3.24. **4.** $12.90. **5.** $4.30. **6.** $4.74. **7.** $4.55.

Pages 128–129. — **1.** 3; 15¢. **2.** 2nd; 2. **3.** John; 50¢. **4.** 26. **5.** $6.55. **6.** $2.35. **7.** $2.25. **8.** $1.40. **9.** $2.88. **10.** $1.10. **11.** $2.85. **12.** $1.30. **13.** 24 mi. **14.** $1.15.

Pages 132–133. — **1.** $5.25. **2.** $3.36. **3.** $2.52. **4.** $6.65. **5.** $5.60. **6.** 7 doz.; 13¢. **7.** $5.95. **8.** $4.65. **9.** 75¢.

Pages 133–134. — **1.** $2.17. **2.** $1.05. **3.** 17¢. **4.** 65¢. **5.** $5.88. **6.** $4.06. **7.** $4.83. **8.** $1.95.

Page 137. — **13.** 23 mi. **14.** $16. **15.** 45 qt. **16.** 32. **17.** 30 da. **18.** $1.95. **19.** $70.00. **20.** 152 mi.

Page 138. — **1.** $18.80. **2.** $14.80. **3.** 56¢. **4.** $1.46. **5.** $1.20. **6.** $1.75. **7.** $6.80. **8.** $1.52. **9.** $3.68. **10.** $6.80.

Pages 142–143. — **1.** $20.25. **2.** $39.15. **3.** $32.85. **4.** $10.75. **5.** $7.65. **6.** $0.65. **7.** $0.34. **8.** $8.45. **9.** $4.30. **10.** 35¢. **11.** $9.15.

Pages 143–144. — **1.** $9.80. **2.** $1.96. **3.** $17.55. **4.** $2.35. **5.** $1.93. **6.** $15.80. **7.** $104. **8.** $5.85. **9.** $4.90. **10.** $0.90.

Page 145. — **3.** $5.00. **4.** $2.48. **5.** $7.34.

Page 146. — **1.** $1.70. **2.** $5.80. **3.** $5.35. **4.** $3.75. **5.** $5.65. **6.** $0.55. **7.** $0.35.

Page 147. — **1.** 72 mi. **2.** 24 mi. **3.** 84 mi. **4.** 21 mi. **5.** $0.92. **6.** $1.28. **7.** $2.80. **8.** $1.60. **9.** $4.75.

Page 148. — **1.** 151. **2.** 32. **3.** $29.20. **4.** $5.10. **5.** 90. **6.** $5.45. **7.** $4.75. **8.** 151. **9.** 208 lb. **10.** $82.50.

FOURTH YEAR

Pages 153–154. — **1.** Yes. **2.** 132 mi. **3.** 7:30. **4.** 5 hr. **5.** 23 mi. **6.** 1 hr. 15 min.

Page 154. — **1.** $1.60. **2.** $5.60. **3.** $5.00. **4.** $5.20. **5.** $3.15. **6.** $9.47; $9.48.

Page 155. — **1.** 828 mi.; 138 mi. **2.** $1.84; $11.04. **3.** 45¢. **4.** $27.75. **5.** $33.30. **6.** 96 mi. **7.** $79.68. **8.** $9.96.

Pages 172–173. — **1.** $1.41. **2.** 33. **3.** 85¢. **4.** 40. **5.** 95¢. **6.** 55¢. **7.** $3.25. **8.** $2.15. **9.** $0.90. **10.** $2.20. **11.** $0.80.

Page 175. — **1.** $7.96. **2.** $2.40. **3.** $6.60. **4.** 12. **5.** 36; 27. **6.** 18. **7.** $1.37. **8.** $17.00. **9.** $1.84.

Page 178. — **1.** 23. **2.** 69¢. **3.** $2.38. **4.** $2.28. **5.** 22 mi. **6.** $1.58. **7.** $19.50. **8.** $2.45. **9.** 570 mi.

Page 181. — **1.** $1.75. **2.** $0.65. **3.** $15.90. **4.** $2.16. **5.** 25. **6.** $14.80. **7.** $3.15. **8.** 60¢ less.

Pages 184–185. — **1.** $2.25. **2.** $1.44. **3.** $1.36. **4.** $5.05. **5.** $2.15. **6.** $1.20. **7.** 40.

Page 185. — **1.** $1.20. **2.** $4.86; $1.14. **3.** Yes. **4.** $3.12.

Page 186. — **1.** 34¢. **2.** $1.28. **3.** 96 qt. **4.** 12 qt. **5.** 84 qt. **6.** 14 qt.

Pages 198–199. — **2.** $1.35. **5.** 8; $2.80. **6.** 16 qt. **7.** 2 pk.; 16 qt. **8.** 15¢. **9.** 5¢.

Page 213. — **1.** $6.72. **2.** $38.70. **3.** $13.70. **4.** 3380. **5.** $13.60. **6.** $1820. **7.** $8.10. **8.** $174.60. **9.** $148.75.

Page 214. — **4.** 24¢. **5.** 10¢. **6.** 24¢. **7.** 10¢. **8.** 40¢. **9.** 8 oz. **10.** 4 oz. **11.** 4 oz.; 8 oz.; 12 oz.

Page 215. — **7.** 1320 ft. **8.** 220 yd. **9.** 42,240 ft. **10.** 660 ft. **11.** 2640.

Page 216. — **2.** 60¢; 30¢. **3.** 56¢; 7¢. **4.** 80¢. **5.** 3 gal. **6.** 32. **7.** 40 pt. **8.** $4.00.

Page 217. — **1.** 8 qt.; 32 qt. **2.** 8 pk. **3.** 32 da. **4.** $3.20. **5.** $2.88. **6.** $1.28. **7.** 20¢. **8.** 70¢. **9.** $2.30. **10.** 8 da.

Page 228. — **1.** 38¢. **2.** $4.32. **3.** $1.20. **4.** 26 mi. **5.** 93. **6.** 203 mi. **7.** $1.92. **8.** $1.90. **9.** 35. **10.** $22.20.

Page 237–238. — **1.** $2.77. **2.** $0.85. **3.** $1.92. **4.** $1.54. **5.** $1.03. **6.** $1.21. **7.** $1.52. **8.** $0.52. **9.** $3.16. **10.** $8.14. **11.** $0.84. **12.** 45.

Page 238. — **1.** 160. **3.** 5¢. **4.** 5¢. **5.** $1.00. **6.** $1.35.

Pages 239–240. — **1.** $1.29. **2.** $7.63. **3.** $5.70. **4.** 296. **5.** 80. **6.** 22. **7.** 62¢. **8.** $11.70. **9.** $1.65. **10.** $2.05. **11.** $4.00. **12.** 15¢.

Pages 241–242. — **1.** $12.48. **2.** $1.50. **3.** $3.12. **4.** $39.50. **5.** $7.90. **6.** $3.60.

Pages 245–246. — **1.** $1.30. **2.** 50¢. **3.** 16¢; $1.28. **4.** 47¢; $3.29. **5.** $1.44. **6.** $2.16. **7.** 35. **8.** $2.25.

Pages 246–247. — **1.** 27¢. **2.** $1.26. **3.** 8 yd. **4.** 6 mi. **5.** 96 mi. **6.** $38.25. **7.** 6. **8.** 8. **9.** 12. **10.** 10 yr. **11.** Mrs. B's; 3 mo. **12.** 25. **13.** 8 yr. **14.** 18. **15.** 40¢. **16.** 15. **17.** 15¢.

Pages 259–260. — **1.** 38 mi. **2.** 16 mi. **3.** $3.99. **4.** 78 mi. **5.** $9.85. **6.** 35¢. **7.** 21; $9.70.

Page 267. — **1.** $2.35. **2.** 35¢. **3.** $2.00. **4.** 144. **5.** 16; 20. **6.** $4.50. **7.** 33, 27¢; 3, 28¢.

Pages 268–269. — **1.** Truck, $1.80. **2.** $4.20. **3.** 85¢ more. **4.** 59¢ more. **6.** 95¢. **7.** 60¢. **8.** $1.00. **9.** $16.25. **10.** 90¢.

Pages 269–270. — **1.** 25¢. **2.** 25. **3.** $6.25. **4.** $1.52. **5.** $2. **6.** 10. **7.** 19. **8.** 5. **9.** 7. **10.** 25¢. **11.** 25 lb. **12.** 64. **13.** 46¢.

Pages 274–275. — **1.** 5. **2.** 8. **3.** 50. **4.** 24. **5.** 54. **6.** 16. **7.** 12. **8.** 51. **9.** 85. **10.** 13. **11.** 24. **12.** 18.

Pages 275–276. — **1.** 60¢. **2.** 20 yd. **3.** 19¢. **4.** 60¢. **5.** 80¢. **6.** 40¢. **7.** 90¢. **8.** 90¢. **9.** $1.35. **10.** 15¢. **11.** 15¢. **12.** 36¢. **13.** $1.20. **14.** $2.52. **15.** $3.00. **16.** 72¢. **17.** 32¢. **18.** 1½ hr.; 2½ hr.

Page 277. — **1.** 15¢. **2.** 8. **3.** 6. **4.** 40¢. **5.** 8. **6.** 20¢. **7.** 4 oz. **8.** 30¢. **9.** 28¢. **10.** 6. **11.** 16 da. **12.** 75¢. **13.** 16 yr.

Page 293. — **1.** 2¼ lb. **2.** 22½ lb. **3.** 4¾ lb. **4.** 6 lb. **5.** 7 yd. **6.** 3¾ lb. **7.** 12½ lb. **8.** 3¼ hr. **9.** $4.80.

Pages 298–299. — **1.** Ralph, 20 sq. ft. **2.** Nell, 4 sq. ft. **3.** Frank, 90 sq. ft. **4.** Mary, 384 sq. in. **5.** 7 by 9, 3 sq. ft. more. **6.** $12.

Pages 300–301. — **1.** $15.30. **2.** 80¢. **3.** $62.50. **4.** 18¢. **5.** $1.45. **6.** $15.60. **7.** $8.00. **8.** $1.75. **9.** $4.50. **10.** $6.96.

Page 306. — **1.** 5. **2.** 10. **3.** 40¢. **4.** 2½¢. **5.** 75¢. **6.** 65 mi. **7.** 8. **8.** 75¢. **9.** 64¢. **10.** 60¢. **11.** 80¢. **12.** $1.20.

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